



DEPARTMENT OF HEALTH AND HUMAN SERVICES  
CENTERS FOR DISEASE CONTROL AND PREVENTION  
National Center for Emerging and Zoonotic Infectious Diseases  
Division of Healthcare Quality Promotion

Healthcare Infection Control Practices Advisory Committee  
(HICPAC)

Meeting Summary Report  
July 17-18, 2014  
The Centers for Disease Control and Prevention  
Atlanta, Georgia

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**Meeting Agenda**  
Healthcare Infection Control Practices Advisory Committee

July 17-18, 2014  
Centers for Disease Control and Prevention  
Tom Harkin Global Communications Center (Building 19, Aud B3)  
1600 Clifton Road NE, Atlanta, GA

**Thursday, July 17, 2014**

<b>Time</b>	<b>Topic</b>	<b>Purpose</b>	<b>Presider/Presenter</b>
9:00	Welcome and Introductions	Information	Neil Fishman (HICPAC Chair) Jeff Hageman (HICPAC DFO)
9:15	Guideline Status Updates: Surgical Site Infections and Neonatal Intensive Care Units	Information	Jeff Hageman (CDC)
9:45	1999 CDC SSI Guideline Recommendations	Information Discussion	Neil Fishman (HICPAC)
10:45	<b>Break</b>		
11:00	HICPAC recommendations for Core Infection Prevention and Control Practices	Information Discussion	Gina Pugliese (HICPAC)
12:15	<b>Lunch</b>		
1:30	Outbreaks Related to the Use of Duodenoscopes and Future Directions	Information Discussion	Alice Guh (DHQP, CDC)
2:30	Update on Catheter-Associated Urinary Tract Infection Prevention and Surveillance	Information Discussion	Carolyn Gould (DHQP, CDC) Alison Laufer (DHQP, CDC)
3:15	<b>Break</b>		
3:35	Update on Catheter-Associated Urinary Tract Infection Prevention and Surveillance (cont.)	Information Discussion	
4:30	Public Comment		
4:45	Liaison/ <i>Ex officio</i> reports		
5:00	<b>Adjourn</b>		

**Friday, July 18, 2014**

<b>Time</b>	<b>Topic</b>	<b>Purpose</b>	<b>Presider/Presenter</b>
9:00	Advanced Laboratory Techniques for Prevention and Control of Healthcare-associated Infections	Information	Clifford McDonald (CDC) Brandi Limbago (CDC) David Henderson (NIH)
10:00	Improving Antibiotic Use Among Hospitalized Patients	Information Discussion	Arjun Srinivasan (CDC)
10:45	<b>Break</b>		
11:00	Infection Control Recommendations for Measles	Information	Amy Fiebelkorn (CDC) David Kuhar (CDC)
11:30	Public Comment		
11:45	Summary and Wrap-Up		
12:00	<b>Adjourn</b>		

Meeting Minutes: Healthcare Infection Control Practices Advisory Committee  
July 17-18, 2014 ||

## **List of Participants**

### **Day 1: July 17, 2014**

#### **HICPAC MEMBERS**

Dr. Neil Fishman, Chair  
Dr. Hilary Babcock  
Ms. Ruth Carrico  
Dr. Sheri Chernetsky Tejedor  
Dr. Daniel Diekema  
Dr. Mary Hayden  
Dr. Susan Huang  
Dr. W. Charles Huskins  
Ms. Lynn Janssen  
Ms. Gina Pugliese  
Dr. Selwyn Rogers  
Dr. Tom Talbot  
Dr. Michael Tapper  
Dr. Deborah Yokoe

#### **DESIGNATED FEDERAL OFFICIAL**

Mr. Jeffrey Hageman, Deputy Chief,  
Prevention and Response Branch, DHQP

#### **EX OFFICIO MEMBERS**

Dr. William B. Baine, Agency for  
Healthcare Research and Quality  
Ms. Elizabeth Claverie-Williams, Food  
and Drug Administration  
Dr. David Henderson, National Institutes  
of Health  
Dr. Gary Roselle, Veterans Administration  
Dr. Daniel Schwartz, Centers for Medicare  
& Medicaid Services  
Ms. Rebecca Wilson, Health Resources  
and Services Administration

#### **LIAISON MEMBERS**

Ms. Kathleen Dunn, Public Health Agency  
of Canada  
Ms. Janet Franck, DNV Healthcare  
Dr. Michael Howell, Society of Critical  
Care Medicine  
Ms. Diana Gaviria, National Association of  
County and City Health Officials  
Dr. Emily Lutterloh, Association of State  
and Territorial Health Officials

Ms. Michael Anne Preas, Association of  
Professionals of Infection Control and  
Epidemiology, Inc.  
Dr. Mark Rupp, Society for Healthcare  
Epidemiology of America  
Dr. Sanjay Saint, Society of Hospital  
Medicine  
Dr. Robert Sawyer, Surgical Infection  
Society  
Ms. Marion Kainer, Council of State and  
Territorial Epidemiologists  
Ms. Margaret VanAmringe, the Joint  
Commission  
Ms. Amber Wood, Association of  
periOperative Registered Nurses

#### **CDC REPRESENTATIVES**

Dr. Matt Arduino, CDC/DHQP  
Dr. Michael Bell, CDC/DHQP  
Dr. Denise Cardo, CDC/ DHQP  
Dr. Nora Chea, CDC/DHQP  
Mr. Manu Choi, CDC/DHQP  
Dr. Maggie Dudeck, CDC/DHQP  
Mr. Jeremy Goodman, CDC/DHQP  
Dr. Carolyn Gould, CDC/DHQP  
Dr. Alice Guh, CDC/DHQP  
Ms. Kristin Hake, Emory Healthcare  
Dr. Rita Helfand, CDC/NCEZID  
Ms. Dyann Matson Koffman, CDC/OADS  
Dr. Alison Laufer, CDC/DHQP  
Ms. Nancy Levine, CDC/DHQP  
Dr. Cliff McDonald, CDC/DHQP  
Ms. Jennifer Mitchell, CDC/DHQP  
Dr. Duc Nguyen, CDC/DHQP  
Ms. Judith Noble Wang, CDC/DHQP  
Ms. Amanda Overholt, CDC/DHQP  
Dr. Ben Park, CDC/DHQP  
Dr. Joe Perz, CDC/DHQP  
Dr. Loria Pollack, DHQP/CDC  
Ms. Cathy Rebmann, CDC/DHQP  
Ms. Jessica Reichard, CDC/NCEZID/OD  
Dr. Melissa Schaefer, CDC/DHQP  
Dr. Issac See, CDC/DHQP  
Ms. Ami Shah, CDC/DHQP  
Dr. Rachel Slayton, CDC/DHQP  
Dr. Jason Snow, CDC/DHQP  
Ms. Erin Stone, CDC/DHQP  
Dr. Nimalie Stone, CDC/DHQP  
Ms. Julie Straw, CDC/DHQP

Ms. Ellen Wan, CDC/DHQP  
Dr. J. Todd Weber, CDC/DHQP/PRB  
Ms. Katie Wilson, CDC/DHQP  
Ms. Sarah Yi, CDC/DHQP

### **HHS REPRESENTATIVES**

Dr. Dale Hu, OASH/HHS

### **MEMBERS OF THE PUBLIC**

Ms. Erin Allen, Georgia State University  
Ms. Kay Argroves, American Association of  
Nurse Anesthetists  
Dr. Phillip Carling, Boston University  
Mr. Russ Castioni, 3M  
Ms. Amy Collins, Veterans Administration  
Ms. Kendra Cox, Cambridge  
Communications, Training, and Assessment  
Ms. Megan DiGiorgio, Gojo  
Mr. Hudson Garrett, PDI  
Mr. Joe Gillis, 3M  
Mr. Lee Grossman, Association for Vascular  
Access  
Ms. Kristen Hake, Emory Healthcare  
Dr. Jeffrey Hammond, Ethicon  
Ms. Shalom Hernandez, Piedmont Atlanta  
Hospital  
Ms. Linda Homan, Ecolab Inc.  
Ms. Eve Humphreys, Society of Healthcare  
Epidemiologists of America  
Ms. Irene Khan, Piedmont Atlanta Hospital  
Ms. Michelle Merrill, Bard  
Mr. Renee Odehnal, Ethicon  
Ms. Barbara Purdon, Genentech  
Ms. Maria Rodriguez, Xenex  
Ms. Michelle Stevens, 3M  
Ms. Rachel Stricof, CSTE Consultant  
Ms. Lisa Tomlinson, Association of  
Professionals of Infection Control and  
Epidemiology, Inc.  
Dr. Chantay Walker, Ethicon  
Mr. Thomas Weaver, Association of  
Professionals of Infection Control and  
Epidemiology, Inc.  
Ms. Cindy Winfrey, PDI  
Mr. Hugo Xi, CareFusion

**Day 2: July 18, 2014**

### **HICPAC MEMBERS**

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Medicine

Dr. Robert Sawyer, Surgical Infection Society  
Ms. Marion Kainer, Council of State and Territorial Epidemiologists  
Ms. Amber Wood, Association of periOperative Registered Nurses

#### **CDC REPRESENTATIVES**

Dr. Denise Cardo, CDC/ DHQP  
Dr. Mary Choi, CDC/DHQP  
Ms. Nicole Coffin, CDC/DHQP  
Dr. Lauren Epstein, CDC/DHQP  
Dr. Amy Fiebelkorn, CDC/NCIRD  
Dr. Scott Fridkin, CDC/DHQP  
Mr. Jeremy Goodman, CDC/DHQP  
Dr. Carolyn Gould, CDC/DHQP  
Ms. Heidi Gruhler, CDC/DHQP  
Dr. Alice Guh, CDC/DHQP  
Dr. Rita Helfand, CDC/NCEZID  
Dr. David Kuhar, CDC/DHQP  
Dr. Alison Laufer, CDC/DHQP  
Dr. L. Clifford McDonald, CDC/NCEZID  
Ms. Amanda Overholt, CDC/DHQP  
Dr. Ben Park, CDC/DHQP  
Dr. Loria Pollack, CDC/DHQP  
Ms. Cathy Rebmann, CDC/DHQP  
Dr. Issac See, CDC/DHQP  
Dr. Jane Seward, CDC/NCIRD/DVD  
Ms. Ami Shah, CDC/DHQP  
Ms. Mihn Soe, CDC/DHQP  
Dr. Melissa Schaefer, CDC/DHQP  
Dr. Rachel Slayton, CDC/DHQP  
Ms. Erin Stone, CDC/DHQP  
Dr. Nimalie Stone, CDC/DHQP  
Dr. Ellen Wan, CDC/DHQP  
Dr. J. Todd Weber, CDC/DHQP  
Ms. Katie Wilson, CDC/DHQP

#### **HHS REPRESENTATIVES**

Dr. Dale Hu, OASH/HHS

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Dr. Phillip Carling, Boston University  
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Ms. Kendra Cox, Cambridge Communications, Training, and Assessment  
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Mr. Hudson Garrett, PDI  
Mr. Joe Gillis, 3M  
Mr. Lee Grossman, Association for Vascular Access  
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Dr. Jeffrey Hammond, Ethicon  
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Ms. Linda Homan, Ecolab Inc.  
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Ms. Michelle Merrill, Bard  
Mr. Renee Odehnal, Ethicon  
Ms. Barbara Purdon, Genentech  
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Ms. Michelle Stevens, 3M  
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Dr. Chantay Walker, Ethicon  
Mr. Thomas Weaver, Association of Professionals of Infection Control and Epidemiology, Inc.  
Ms. Cindy Winfrey, PDI  
Mr. Hugo Xi, CareFusion

## Executive Summary

The Division of Healthcare Quality Promotion (DHQP), National Center for Emerging and Zoonotic Infectious Diseases (NCEZID, Centers for Disease Control and Prevention (CDC), U.S. Department of Health and Human Services (HHS) convened a meeting of the Healthcare Infection Control Practices Advisory Committee (HICPAC) on July 17-18, 2014 in Atlanta, Georgia. The Designated Federal Official (DFO) and Chair confirmed the presence of a quorum of HICPAC voting members and *ex officio* members on both days of the meeting.

The meeting was called to order at 9:08 am on July 17, 2014.

Drs. Denise Cardo and Rita Helfand provided brief updates on DHQP and NCEZID activities related to CDC's efforts to improve laboratory safety, the Ebola outbreak in West Africa, and the undocumented children at the US-México border.

Mr. Jeffrey Hageman presented updates on the status of the Surgical Site Infections (SSI) and Neonatal Intensive Care Unit (NICU) guidelines. Dr. Neil Fishman reviewed, and HICPAC discussed, topic areas that were included in the 1999 SSI Prevention Guidelines but were not included in the guideline update. It was moved, seconded, and unanimously approved by HICPAC that the set of strong recommendations from the 1999 SSI guideline that were not re-assessed in the SSI guideline update should be carried forward as current strong recommendations, pending the recommended changes outlined during the meeting.

Ms. Gina Pugliese presented draft "Core Practices for Infection Prevention: Minimum Expectations for Safe Care Across Healthcare Settings." The name will be changed to reflect settings in which healthcare occurs. It was moved, seconded, and unanimously approved that HICPAC provisionally accept the "Core Infection Prevention and Control Practices" document, pending recommended changes.

Dr. Alice Guh presented information on outbreaks related to the use of duodenoscopes during procedures and suggested interim guidance for culturing of those instruments. HICPAC recognized the problem, but concluded that more data are needed to determine the right solution, which may not be culturing. They felt this work is the manufacturers' responsibility.

Dr. Carolyn Gould presented the status of current national data on Catheter-Associated Urinary Tract Infection (CAUTI), including the Targeted Assessment for Prevention (TAP). Dr. Alison Laufer described a Standardized Utilization Ratio (SUR) metric that is being developed for indwelling urinary catheters. Dr. Gould provided HICPAC with an update on the status of CAUTI surveillance definitions since her last presentation on the subject in June 2013. HICPAC expressed concerns about the standardized DUR as it is currently defined, and does not feel that it is appropriate at this time to use the standardized DUR as a quality metric. HICPAC feels that a clinically-relevant definition of CAUTI is required that can be used as a meaningful quality improvement metric. HICPAC proposes the following definition: greater than  $10^5$  uropathogens, excluding yeast; less than or equal to two pathogens, excluding yeast; including fever without attribution; and excluding urinalysis. HICPAC recommends developing a measure of urine culture utilization as a quality improvement metric.

HICPAC liaison groups provided written and verbal updates. HICPAC stood adjourned from 5:15 pm on July 17 until 9:05 am on July 18.

Drs. L. Clifford McDonald, Brandi Limbago, and David Henderson presented on advanced laboratory techniques for prevention and control of healthcare-associated infections (HAIs).

Advanced molecular detection (AMD), understanding how the human microbiome is related to controlling multi-drug resistant organisms (MDROs), and the contribution of whole genome sequencing (WGS) are promising directions.

Dr. Arjun Srinivasan provided HICPAC with an update on CDC's work regarding antibiotic prescribing and antibiotic stewardship.

Ms. Amy Fiebelkorn and Dr. David Kuhar shared information regarding infection control recommendations for measles. CDC recommends clarifying current recommendations regarding measles and the use of personal protective equipment (PPE). HICPAC supported the proposed clarification.

HICPAC stood in recess at 11:51 am on July 18, 2014. The next HICPAC meeting will be held in Atlanta, Georgia in November 2014.



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Healthcare Infection Control Practices Advisory Committee (HICPAC)

July 17-18, 2014  
Atlanta, Georgia

**DRAFT Minutes of the Meeting**

The Division of Healthcare Quality Promotion (DHQP), National Center for Emerging and Zoonotic Infectious Diseases (NCEZID), Centers for Disease Control and Prevention (CDC), United States Department of Health and Human Services (HHS) convened a meeting of the Healthcare Infection Control Practices Advisory Committee (HICPAC) on July 17 and 18, 2014 at the Tom Harkin Global Communication Center (Building 19), Centers for Disease Control and Prevention, 1600 Clifton Road NE, Atlanta, Georgia.

**Thursday, July 17, 2014**

**Welcome and Introductions**

**Neil Fishman, MD**  
**HICPAC Chair**

**Jeffrey Hageman, MHS**  
**Deputy Chief, Prevention and Response Branch, DHQP, NCEZID**  
**Centers for Disease Control and Prevention**  
**HICPAC Designated Federal Official**

Dr. Neil Fishman, HICPAC Chair, called the meeting of HICPAC to order at 9:08 am. He conducted a roll call of HICPAC members, *ex officio* members, and liaison representatives. A quorum was present. HICPAC members disclosed conflicts of interest.

- ☐ Dr. Tom Talbot's spouse receives research funding from Sanofi Pasteur, MedImmune, and Gilead Sciences, Inc.
- ☐ Dr. Dan Diekma has received research funding from Forest Laboratories and bioMérieux.
- ☐ Dr. Mary Hayden has received product to conduct research from Sage Products, Inc., and from PDI, Inc. She has conducted unfunded research for Cepheid Corporation.
- ☐ Dr. Susan Huang is conducting a clinical trial in which participating hospitals are receiving products from Mölnlycke Health Care and Sage Products, Inc.

Mr. Jeffrey Hageman, HICPAC Designated Federal Official (DFO), welcomed Dr. Charles Huskins to his first meeting as a HICPAC member. He noted that Ms. Elizabeth Claverie-Williams is the new *ex officio* representative from the Food and Drug Administration (FDA). Dr. Stephen Weber is the new liaison representative from the Infectious Diseases Society of America (IDSA).

**Denise Cardo, MD**  
**Director, DHQP, NCEZID**  
**Centers for Disease Control and Prevention**

Dr. Cardo explained that Dr. Michael Bell, DHQP Deputy Director, was asked by CDC Director Dr. Tom Frieden to serve a three-month detail to lead CDC's efforts to improve laboratory safety. This work will address protocols but apply principles that have been successful in preventing healthcare-associated infections (HAIs). Dr. Bell has a strong understanding of how laboratories work, and he will engage with CDC leaders and divisions to shift the agency to a safety-focused culture. In the past, incidents were addressed independently and the overall problem was not considered. Dr. Frieden and Dr. Beth Bell, NCEZID Director, have been proactive and transparent as they have explained the problem and the steps they are taking to address it. CDC leadership believes in accountability at all levels.

**Rita Helfand, MD**  
**Senior Advisor for Science**  
**DHQP, NCEZID**  
**Centers for Disease Control and Prevention**

Dr. Helfand noted that all information gathered from the internal response to the laboratory incidents is provided in a report which is on the CDC website. Outbreaks continue, and the divisions in NCEZID are involved in current Emergency Operations Center (EOC) activations for two of these:

- ❑ The Ebola outbreak in West Africa is now the largest Ebola outbreak in history. DHQP always plays a role in infection control in outbreak responses.
- ❑ The lead agencies for addressing the unaccompanied children at the US-México border are the HHS Office of Refugee Resettlement and the US Department of Homeland Security (DHS) through the Federal Emergency Management Agency (FEMA). CDC is assisting as requests are received. For instance, an Epi-Aid was conducted investigate clusters of pneumonia that appear to be pneumococcal pneumonia. No issues of public health concern to the larger US population have been detected.

In addition to current responses, NCEZID's Divisions were involved Middle East Respiratory Syndrome Coronavirus (MERS-CoV) working with state health partners and other international and domestic partners. The EOC is no longer activated, as cases are still occurring at a slower pace. Saudi Arabia and others in that region have put a great deal of energy into their response. At this time, it is important to maintain vigilance in case the virus changes and becomes more efficient in transmission. No cases of transmission were identified from the two US cases. It is important to ensure that healthcare personnel think about MERS-CoV as a possibility so that infection control is implemented rapidly. Strategies such as wearing masks and immediately asking patients with respiratory illnesses about their past travel are important. Studies are ongoing to ascertain how MERS-CoV is being transmitted and to shed light on risk. HICPAC noted that it would be interesting to learn whether transmission was due to lapses in healthcare precautions and infection control or another issue.

There has been an upsurge of cases of introduced Dengue fever and Chikungunya virus diagnosed within New York City. The Chikungunya cases are likely related to the outbreaks in the Caribbean. HICPAC hoped for an update on CDC's thinking regarding importation of Dengue and Chikungunya, and implications of the latter on the safety of the blood supply.

## **Guideline Status Updates: Surgical Site Infections and Neonatal Intensive Care Units**

**Jeffrey Hageman, MHS**

**Deputy Chief, Prevention and Response Branch, DHQP, NCEZID**

**Centers for Disease Control and Prevention**

**HICPAC Designated Federal Official**

Mr. Hageman reminded HICPAC of the guideline development process, which begins with establishing a core writing group and methods. The writing group develops the key questions, performs searches for existing guidance, conducts systematic literature search and analyzes the evidence, and constructs draft recommendations. Throughout the process CDC will present status and content to HICPAC for input. Once a draft guideline is developed a notice is posted in the federal register that the guideline is open for public comment. The draft and all comments are posted on [www.regulations.gov](http://www.regulations.gov). The comments are reviewed at CDC, grouped, and reviewed at a HICPAC meeting to get input on proposed changes or actions (e.g., conducting additional literature review) based on the public comments. Once additional work is completed a final draft will be reviewed by HICPAC for any additional input. Pending no additional changes, HICPAC will vote to approve the draft. Following the HICPAC meeting, CDC will finalize the draft it will be submitted to CDC clearance. Following approval it will be posted on CDC's website. The guideline or sections (e.g., executive summary) may also be published by the co-authors.

The first phase of public comment on the draft guideline for Surgical Site Infection (SSI) was open from January 29 – February 28, 2014. The draft and public comment were discussed during the last HICPAC meeting in April 2014. The public comment period was extended for a second phase from April 8 – May 8, 2014. Five additional commenters contributed during this time. All of the comments are available on [www.regulations.gov/#!docketDetail;D=CDC-2014-0003](http://www.regulations.gov/#!docketDetail;D=CDC-2014-0003).

The comments were in three categories.

- ☐ Clarifications of intent or wording
- ☐ Categorization of recommendations as Category I, Category II, or No Recommendation
- ☐ Recommendations for updated literature searches

The literature search was updated after the April 2014 HICPAC meeting, with new searches extending into 2014. The updated search yielded over 500 abstracts. The abstracts were screened, and over 90 full texts will be reviewed. The new texts address most of the major topic areas of the SSI Guidelines. Topics with no new literature are normothermia, glycemic control, and intraoperative irrigation.

Next steps include extracting the new studies, undergoing the Grading of Recommendations Assessment, Development and Evaluation (GRADE) process, and incorporating the new studies into the aggregate GRADE tables. Based on the updated rating, each of the draft recommendations will be reviewed to determine whether the new evidence changes a recommendation, further supports it, or changes its strength. If necessary, the HICPAC workgroup will be reconvened to address any “No Recommendation” categories that will change as a result of the new evidence. Revised draft recommendations will be presented for final input and approval at an upcoming HICPAC meeting.

The Neonatal Intensive Care Unit (NICU) Guideline is similar to the SSI Guideline, as it is not intended to provide comprehensive infection control recommendations for all aspects of care

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provided in a NICU. The guideline focuses on the following four pathogen-specific areas, and as new areas or issues arise, they can be addressed via segmental updates:

- ☐ *Clostridium difficile* (*C. difficile*)
- ☐ Central-line associated bloodstream infections (CLABSI)
- ☐ Methicillin-resistant *Staphylococcus aureus* (MRSA)
- ☐ Respiratory infections

There is a lack of evidence for many areas in the NICU because of a lack of studies. There is a need to provide practical implementation guidance as well as comments on areas without recommendations. A group of partners from the Society for Healthcare Epidemiology of America (SHEA), the Pediatric Infectious Diseases Society (PIDS), and other experts are working on an implementation guide, which can be released when the NICU Guideline is released.

A draft of the NICU Guideline was reviewed by HICPAC and submitted to CDC clearance. The literature search will be extended into 2014 before the draft is released for public comment. Over 500 abstracts were found and are being reviewed. The CLABSI abstract review is in progress. Full-text reviews are being conducted of 25 articles regarding *C. difficile*, 48 regarding MRSA, and 44 regarding respiratory pathogens.

The results of the literature search will undergo the GRADE process and be aggregated with the current GRADE tables. The draft recommendations will be reviewed to determine whether the new literature will impact them. The guideline will be released for public comment for 60 days.

Dr. David Kuhar is the DHQP lead on the Healthcare Personnel Guideline, which focuses on three topic areas:

- ☐ Baseline Infrastructure and Routine Practices
- ☐ Special Infectious Diseases
- ☐ Special Healthcare Personnel Populations

The writing group includes representatives from DHQP and the National Institute for Occupational Safety and Health (NIOSH). Groups from CDC divisions focused on specific pathogens will be enlisted for those sections of the guideline. HICPAC liaison representatives Dr. Mark Russi from the American College of Occupational and Environmental Medicine (ACOEM) and Dr. David Weber of SHEA are also participating. Former HICPAC member Tammy Lundstrom is still involved in the process. Additional HICPAC members participating are Dr. Hilary Babcock, Ms. Ruth Carrico, Dr. Tom Talbot, and Dr. Michael Tapper.

The next steps are to reconvene the writing group to finalize the baseline practices and to begin the infectious disease section.

### Discussion Points

HICPAC hopes that future guidelines will be “living guidelines” that are updated as new literature is released. DHQP is working internally to compile all of the recommendations into a web-based interface so that they can be “living documents.” This process will identify which areas need to be updated based on new evidence. They have not previously conducted segmental updates of guidelines, and are considering how to gather public comment efficiently when small sections of guidelines are updated. Given that many updated recommendations are linked to products and innovations, it is important to allow adequate time for industry and other public partners to provide input. An ongoing process could be used for reviews and updates,

and a format could be created for submitting recommendations for updates to different parts of guidelines.

In the past, HICPAC has discussed reassessing how the GRADE process is applied to HICPAC's guideline development. DHQP is considering different options. The overall process can be more efficient so that it does not take years to release recommendations, and so they are not "playing the catch-up game" with the evidence. DHQP intends to bring methodological expertise in-house. Other groups that are experiencing similar challenges with the literature base will help inform this process. Randomized trials will not be available for many of their areas of interest. GRADE focuses on high-quality evidence, but there are emerging and newer ways to conduct research, including observational and quasi-experimental designs. The division is exploring reassessing the hierarchy of evidence and whether other observational designs should have a high ranking. It is important not to duplicate efforts. If groups within the field of infection prevention control that create guidance and recommendations can harmonize their methods, then there will be opportunities to share the burden of extracting and grading evidence, which will maximize resources and speed processes. HICPAC members are strong researchers, and their input is needed in this area. It is also important that HICPAC discusses key questions, critical outcomes and impacts, and harms. Further, HICPAC can help articulate the recommendations clearly.

## **1999 CDC SSI Guideline Recommendations**

**Neil Fishman, MD**  
**HICPAC Chair**

A group of recommendations classified as "strong" in the 1999 SSI Guideline were not considered for the update since they had already been previously identified as strong recommendations and many have become part of standard practice. Therefore, the writing group decided that there was little value in re-assessing these recommendations. HICPAC members and a group of subject matter experts (SMEs) reviewed those recommendations.

The goal of this work is to establish a set of surgical core practices. The recommendations are strong, but in many instances, they have been incorporated into the standard of care and additional research or evidence is unlikely to have been conducted. The conclusions of the HICPAC members and SMEs generally correlated well, but there were some minor differences.

### Preparation of the Patient

The existing recommendations are as follows:

- ☐ Whenever possible, identify and treat all infections remote to the surgical site before election operation and postpone elective operations on patients with remote site infections until the infection has resolved.
- ☐ Do not remove hair preoperatively unless the hair at or around the incision site will interfere with the operation.
- ☐ If hair is removed, remove immediately before the operation, preferably with electric clippers.
- ☐ Encourage tobacco cessation. At minimum, instruct patients to abstain for at least 30 days before elective operation from smoking cigarettes, cigars, pipes, or any other form of tobacco consumption (e.g. chewing/dipping).
- ☐ Thoroughly wash and clean at and around the incision site to remove gross contamination before performing antiseptic skin preparation.

The recommended changes are:

- ❑ Combine the second and third points into a single recommendation: “Do not remove hair preoperatively unless the hair at or around the incision site will interfere with the operation. If hair removal is necessary, remove immediately before the operation, with clippers, and preferably outside of the operating room.”
- ❑ Simplify the fourth point to read: “Encourage tobacco cessation for a minimum of at least 30 days before elective operation.”

### Discussion Points

There is variability regarding the question of where clipping occurs. The new wording of the recommendation may represent a change of practice for some hospitals. There was concern that the recommendation may lead institutions to return to the older practice of preparing patients in their rooms the night before surgery, especially if they do not have adequate space outside the operating room to conduct the clipping or shaving. The evidence is clear on the importance of the timing of hair removal, and the recommendation is worded such that the hair removal should take place immediately before the operation.

The Association of periOperative Registered Nurses (AORN) has recommended hair removal outside the operating room for the past five years. A Cochrane review addresses the theoretical concern associated with clipping inside the operating room. The citation in the review was a textbook, but it indicated that hair from the clipping could get into the air and settle onto the sterile field. No studies have examined the dispersal of hair from clipping. There may be other options for removing hair, and AORN has considered recommending wet clipping or containing hair if it must be clipped in the operating room. There is no evidence on this point, and there may never be. AORN’s recommendation includes the provision “when feasible.” Many facilities clip hair in the pre-operative area. Considerations are made for privacy and the patient’s comfort. Before this recommendation was implemented at one facility, hair was frequently discovered on instrument tables, which resulted in an interruption of the process when new instruments were utilized to avoid inadvertent contamination. The word “preferably” in the recommendation implies that there may be risk in clipping hair inside the operating room. If there is no evidence to indicate risk, then the word should be deleted. Some of these issues might be addressed in the text as opposed to in the recommendations themselves. The recommendation could remain as written, but the text could refer to the AORN statement.

HICPAC discussed concerns with making changes to the guidelines post-hoc. If the committee is to decide which recommendations from 1999 to bring forward, they are limited in their ability to modify or add to the recommendations. They should be cautious about adding new elements without the thorough review process that characterizes the rest of the new guidelines.

The intent of some of the 1999 recommendations is not clear, and HICPAC can clarify them where needed. If the recommendations should be included as core practices, then that document will indicate that the recommendations did not undergo rigorous systematic evidence reviews and will likely not have rigorous evidence available to inform their modification. The document will state that HICPAC believes that these elements should be standard practice and are not included in the systematic, rigorous SSI Guideline. The document can also link to professional societies that can release guidance.

These recommendations will be utilized by the Joint Commission and the Centers for Medicare and Medicaid Services (CMS). Public comments received for the draft SSI guideline update

noted concerns that if these recommendations from the 1999 Guideline were not re-emphasized by CDC and HICPAC, even though they may be standard practice, institutions may stop doing them. When the Joint Commission reviewed the draft SSI document, there was concern in this area. It is important for the Joint Commission and other accreditation organizations to ensure that facilities still engage in those standard practices with the understanding that RCTs are not always conducted to provide evidence for them. A “no recommendation” has meaning, particularly to an institution without a strong infection control group. Such a group might interpret “no recommendation” to mean that CDC does not recommend a practice. This interpretation has profound implications in resource-constricted environments. Until all of the guidelines are made current, there should be a process for assessing and refreshing the recommendations, knowing that many of the older recommendations will not have new evidence to support them. The guideline development process should also reflect on practices that take staff time, but that do not add to the care of the patient. Some of the recommendations may be affected by technological innovations or changes that may require updates. The Core Practices document could incorporate some of the SSI recommendations in their own section.

Most people in perioperative care adhere to the AORN guidelines. It would be beneficial for the CDC guidelines to harmonize with those guidelines to the extent possible.

The following phrasing was suggested: “Do not remove hair preoperatively unless the hair at or around the incision site will interfere with the operation. If hair removal is necessary, remove immediately before the operation, with clippers.”

The language regarding suggested tobacco cessation is redundant and could be streamlined to read: “at least 30 days” or “a minimum of 30 days.” The point about tobacco cessation could be included in the Core Practices document.

### Hand/Forearm Antisepsis

The 1999 Guideline reads:

- ☐ Keep nails short and do not wear artificial nails.
- ☐ Perform a preoperative surgical scrub for at least two to five minutes using an appropriate antiseptic. Scrub the hands and forearms up to the elbows.
- ☐ After performing the surgical scrub, keep hands up and away from the body (elbows in a flexed position) so that water runs from the tips of the fingers toward the elbows. Dry hands with a sterile towel and don a sterile gown and gloves.

The recommendation regarding nails is addressed in the Hand Hygiene Guideline. The recommendations regarding surgical scrubbing are somewhat antiquated in view of the more widespread use of alcohol-based rubs. It is therefore recommended that the entire section in Hand/Forearm Antisepsis be deleted.

### Discussion Points

A reference should be provided to the Hand Hygiene Guideline. Surgical scrub should be performed. The Core Practices document does not address surgical scrub; however, the wording of the 1999 Guideline does not pertain to more contemporary surgical scrubs. The recommendation could state that a surgical scrub should be performed and then provide references to more contemporary scrub methods. Hand scrubs are still performed, albeit not as frequently. It may be appropriate to recommend that users refer to the manufacturer's instructions for product usage.

### Management of Infected or Colonized Surgical Personnel

Because this recommendation is reflected in the Core Practices Guideline and will be addressed in the Healthcare Personnel Guideline, it is recommended that this section be deleted. HICPAC agreed with this recommendation.

### Antimicrobial Prophylaxis

These points are covered more extensively in other recent guidelines. This section only addresses colorectal surgery and vancomycin, and it is recommended that this section be deleted. HICPAC agreed with this recommendation.

### Ventilation

Users do not use this document to determine ventilation requirements for operating rooms; rather, they refer to information from the Facilities Guidelines Institute (FGI). The recommendation, therefore, is to refer to those guidelines:

“Maintain positive pressure ventilation in the operating room and adjoining spaces. Maintain the number of air exchanges, air flow patterns, temperature, humidity, location of vents, and use of filters in accordance with recommendations from the most recent version of the Facilities Guidelines Institute – Guidelines for Design and Construction of Hospitals and Outpatient Facilities (current version – 2014).”

### Discussion Points

The 2014 FGI guidelines for hospitals and healthcare facilities was dedicated to the memory of Judene Bartley, a former HICPAC member. The FGI guidelines address both existing and new facilities, and some states give existing facilities time to meet the criteria.



## Cleaning and Disinfection of Environmental Surfaces

The existing recommendations are as follows:

- ☐ When visible soiling or contamination with blood or other bodily fluids of surfaces or equipment occurs during an operation, use a US Environmental Protection Agency (EPA)-approved hospital disinfectant to clean the affected areas before the next operation.
- ☐ Do not perform special cleaning or closing of operating rooms after contaminated or dirty operations. (Category 1B)
- ☐ Do not use tacky mats at the entrance to the operating room suite or individual operating rooms for infection control.

The points are addressed in both the Core Practice and Environmental Guidelines, but the expert group felt that the second point should remain, as it is a source of questions in many institutions. Therefore, it is recommended that the first and third points be deleted and the second point be maintained.

## Microbiological Sampling of the Environment

This area is a single point in the 1999 Guidelines, and it is addressed in the Environmental Guideline. The expert group recommends deleting this section.

## Discussion Points

The Environmental Guideline states that environmental sampling should not be performed in a hospital unless it is part of an outbreak investigation. The operating room is part of the hospital, but there was concern among HICPAC members whether the Environmental Guideline is specific enough. When there is agreement regarding which of the core practices is still current practice, then a column could be added to provide additional explanation and rationale. For instance, this point could note that sampling is included in the Environmental Guideline.

## Sterilization of Surgical Instruments

The current recommendation reads:

- ☐ Sterilize all surgical instruments according to published guidelines.
- ☐ Perform flash sterilization only for patient care items that will be used immediately (e.g., to reprocess an inadvertently dropped instrument). Do not use flash sterilization for reasons of convenience, as an alternative to purchasing additional instrument sets, or to save time.

The group recommends maintaining the first point as written. Because the term “flash sterilization” is outdated, the following wording is suggested:

“Immediate-use steam sterilization should never be used for reasons of convenience, as an alternative to purchasing additional instrument sets, or to save time. This practice should be reserved only for patient care items that will be used immediately in emergency situations when no other options are available (e.g., to reprocess an inadvertently dropped instrument).”

## Discussion Points

The example of an “inadvertently dropped instrument” is part of the original guideline, but it may need to be removed, as it provides flexibility. If an instrument is dropped, then another one could be available. Using that one would be preferable to sterilizing the dropped instrument. Stating “when no other options are available” will address that point.

It was suggested that the category title be rephrased to “reprocessing” rather than “sterilization.” A phrase could be added so that the first point refers to sterilizing “according to published guidelines and manufacturer’s recommendations.”

There is overlap with the CDC Sterilization Guidelines. This recommendation should refer to them.

There was discussion regarding the term “flash sterilization.” The field is moving away from the mindset that sterilization for immediate use can be done “in a flash.” Instead, it is a process of proper decontamination. The change is in culture and in terminology. AORN has a Clinical Issues column on this issue, and the group’s Recommended Practices for Sterilization addresses it. The new preferred terminology is “immediate-use sterilization.”

## Surgical Attire and Drapes

The 1999 Guideline reads:

- ☐ Wear a surgical mask that fully covers the mouth and nose when entering the operating room is an operation is about to begin or already underway, or if sterile instruments are exposed. Wear the mask throughout the operation.
- ☐ Wear a cap or hood to fully cover hair on the head and face when entering the operating room.
- ☐ Do not wear shoe covers for the prevention of SSI.
- ☐ Wear sterile gloves if a scrubbed surgical team member. Put on gloves after donning a sterile gown.
- ☐ Use surgical gowns and drapes that are effective barriers when wet (i.e., materials that resist liquid penetration).
- ☐ Change scrub suits that are visibly soiled, contaminated, and/or penetrated by blood or other potentially infectious materials.

The expert group recommends bringing all of the points forward with minor changes in the second and sixth points, with changes indicated in italics:

- ☐ Wear an *appropriate* cap or hood to fully cover hair on the head and face when entering the operating room.
- ☐ Change scrub suits that are *heavily* soiled, contaminated, and/or penetrated by blood or other potentially infectious materials.

The addition of the word “appropriate” in the second point addresses use of cloth caps that are not sterile.

## Discussion Points

Regarding the proposed change in the sixth point, it was noted that the Occupational Safety and Health Administration (OSHA) requirements refer to visible soil, blood, and bodily fluids.

The guideline should be specific about what constitutes an “appropriate” cap or hood. This area is controversial, and the point could be interpreted in different ways. The phrase “surgical head covering” could be used instead of “appropriate cap or hood.” The recommendation only refers to hair on the head and face when it is important to cover all facial hair. The key point is to ensure that a new surgical head covering is used for every operation. Many personnel wear a favorite cap multiple times. Some hospitals are working to discourage that practice. Some hospitals now require bouffant covers over the cloth covering. AORN has an entire recommendation on attire, with details about the types of hair coverings that should be used as well as laundering and other considerations. AORN’s recommendation is that wearing reusable hats may be acceptable if they are laundered daily in an accredited facility. It is not possible to address the scope of this issue in one sentence. HICPAC’s goal is not to delve into all of the details of the issue, but to bring forward and clarify concepts from the 1999 Guideline.

A possible wording alternative is “Wear a clean surgical cap or hood to fully cover hair on the head and face not covered by the surgical mask when entering the operating room.” The addition of “semi-restricted area” was suggested, as traffic zones in the operating room are semi-restricted areas in which the proper attire is required. AORN uses this terminology, and FGI may as well.

It was noted that the recommendations indicate that the hair of all healthcare personnel should be covered in restricted areas, but HICPAC and the SMEs are struggling with whether patients’ hair should be clipped in the same location. They may be applying two different standards regarding hair and protecting from shedding bacteria, and the recommendation to cover healthcare personnel hair may be a rationale for not clipping patient hair in the operating room, whenever feasible.

The writing group will edit the wording of the recommendation to reflect HICPAC’s discussion.

## Asepsis and Surgical Technique

The 1999 Guideline is:

- ☐ Adhere to principles of asepsis when placing intravascular devices (e.g., central venous catheters), spinal or epidural anesthesia catheters, or when dispensing and administering intravenous drugs.
- ☐ Handle tissue gently, maintain effective hemostasis, minimize devitalized tissue and foreign bodies (i.e., sutures, charred tissues, necrotic debris), and eradicate dead space at the surgical site.
- ☐ Use delayed primary skin closure or leave an incision open to heal by second intention if the surgeon considers the surgical site to be heavily contaminated (e.g., Class III and Class IV).
- ☐ If drainage is necessary, use a closed suction drain. Place a drain through a separate incision distant from the operative incision. Remove the drain as soon as possible.

The HICPAC group deferred to the SMEs on the second and third points. The SMEs were deadlocked on whether to keep or delete the points. Because of a lack of specific evidence, it is recommended that the second and third points be deleted. Further, the wording of the first statement will be altered to read:

“Adhere to principles of aseptic technique when performing all surgical procedures.”

The fourth statement is recommended to be maintained as written.

### Discussion Points

The new, generalized phrasing of the first statement addresses surgical procedures, where the previous wording addressed safe injection practice. If the wording of the first statement is changed to make it more general, then it could be deleted from this guideline, since the points are included in Core Practices and in the Safe Injection Guidelines. Reference should be made to those guidelines. The Core Practices document has a section on invasive medical devices, where the statement in this guideline is about procedures. The word “surgical” could be removed so that the statement will read, “when performing all procedures.” This change will focus the statement less on the surgery itself.

The word “invasive” rather than “surgical” was suggested, as “invasive” encompasses other procedures. The original statement was meant to broaden beyond areas for which guidelines are already available. There are line insertion practices and guidelines, but there may not be guidelines for spinal and epidural anesthesia catheters. It is important to ensure that these practices are followed for other procedures in the operating room and to maintain the original goal of the 1999 Guideline. The concept is captured with the wording “invasive procedures.”

AORN is transitioning from referring to “aseptic” to “sterile,” so using “sterile technique” will harmonize this document with AORN.

### Post-Operative Incision Care

The 1999 recommendations are:

- ☐ Protect with a sterile dressing for 24-48 hours postoperatively an incision that has been closed primarily.
- ☐ Wash hands before and after dressing changes and any contact with the surgical site.

The group recommends deleting the second point, which is addressed in the Hand Hygiene Guidelines, and rewording the first point to read “Protect incisions that have been closed primarily with a sterile dressing for 24-48 hours post-operatively.”

### Discussion Points

No evidence is available for protecting incisions with a sterile dressing, but the voting of the SMEs was unanimous on this point. Use of sterile dressings is standard practice and will not be subjected to an RCT.

The range of 24-48 hours generates some confusion, but no evidence is available for a more specific time. A more firm statement, such as “a minimum of 24 hours,” would give flexibility to institutions that want a longer range but would still establish a minimum. Using the endpoint of 48 hours establishes when the dressing is no longer useful and a patient can shower and not

worry about the incision site. The 24-48 hour range is based on a removing a dressing on the morning of the second post-operative day. If the recommendation on timing is changed, then all post-operative discharge instructions will have to be re-written.

If there is no additional evidence to support a change in the timeframe, then the guideline should be carried forward as presented. Because new recommendations are not available, the 1999 Guideline represents the current CDC and HICPAC recommendations. If they are outdated, then they should be archived.

There was discussion regarding whether the focus of the recommendation was on having a clean, sterile dressing, or on how long the dressing should be left on, and what would happen if the dressing were not left on for 24-48 hours. The recommendation is based on placing the dressing at the end of a procedure and leaving it in place unless it gets very soiled.

## **HICPAC Recommendations for Core Infection Prevention and Control Practices**

### **Gina Pugliese, RN, MS HICPAC Member**

Mr. Hageman reminded HICPAC that the draft is the result of a consideration of existing CDC and HICPAC recommendations. The focus of the discussion should be on the content of the draft so that they can move forward and implement them.

Ms. Pugliese explained that the first step was a review of core practices in existing CDC and HICPAC guidelines, considering duplication and redundancy as well as differences in scoring of evidence and in wording. The working group's goals were to:

- ☐ Describe a core set of infection prevention elements that are essential for healthcare that occurs in all settings, regardless of the level of care provided; and
- ☐ Ensure consistency and eliminate redundancy in the guidelines.

The group identified an initial list of core practices and reviewed current CDC and HICPAC guidelines to determine whether the practices are included in them. They created a summary table, combining and shortening the elements as appropriate. Drafts of the practices have been presented and discussed at HICPAC meetings and in working group meetings.

### **Core Practice #1: Leadership Support**

- ☐ Ensure that the governing body of the agency delivering healthcare is accountable for supporting the infection prevention activities that are relevant to the services provided and the patient populations cared for at the facility.
- ☐ Allocate appropriate resources, both human and material, to infection prevention activities to enable consistent, agile, and immediate response to infection risks.
- ☐ Empower and support positional authority to those responsible for the infection prevention activities to enable consistent, effective and immediate response to infection risks.

## Discussion Points

Leadership should know the HAI incidence rate at their facilities. Stating that they are accountable for infection prevention does not imply that they know or understand their HAI incidence. It is challenging to convince some hospitals and long-term care facilities that they should conduct surveillance to know their incidence.

The core practices should apply across a range of healthcare facilities, not just to acute care. If the recommendations are too specific, then they will apply to some facilities and not to others. The goal of the Core Practices document is to be broad and to reach into areas where infection prevention and control activities have not been traditionally accepted, such as long-term and ambulatory care settings. However, introducing a new recommendation may cloud the purpose of the document. Individual groups will develop the core practices for their specific facilities. Leadership support may have different meanings in different settings. Awareness of HAI incidence is an important function of leadership, but it may only be relevant at this time for a select few groups.

Terminology was suggested to indicate that these recommendations apply to all settings in which healthcare is delivered, as opposed to “healthcare facilities.” This change will ensure that the document addresses home-based care, vaccinations administered in pharmacies, and other relevant settings, including behavioral healthcare. These recommendations should not be facility-dependent. The first sentence of the introduction could be reworded to refer to “all settings where healthcare is provided,” which is more descriptive. The change could also be reflected in the title of the document so that it might be, “Core Practices for Infection Prevention: Minimum Expectations for Safe Care Across All Settings Where Healthcare is Provided.” HICPAC agreed with the proposed change.

The Guideline for Isolation Precautions was the first to state that the practices apply across different settings. The preamble to the Core Practices document will refer to the range of settings: “The venues include, but are not limited to, inpatient settings, e.g. acute, long-term care, rehabilitation, behavioral health, and outpatient settings, e.g. physician and nurse practitioner offices, clinics, urgent care, ambulatory surgery centers, image centers, dialysis centers, outpatient laboratories, ambulatory behavioral health and substance facilities, and physical therapy and rehabilitation centers.” The preamble also states that “many of these core practices may also be useful for preventing infections when applied outside of traditional healthcare settings, for example, spas where aesthetic procedures are performed.” The new language will also include settings that may not be listed, such as home health, or that may arise in the future. The list cannot be all-inclusive, and it is likely to change.

## Core Practice #2: Education and Training of Healthcare Personnel on Infection Prevention

- ☐ Include training specific to infection prevention as appropriate to job responsibilities.
- ☐ Develop processes to ensure that all healthcare personnel understand and are competent to perform their roles and responsibilities in a manner that will minimize the likelihood of infection

## Discussion Points

There was discussion regarding potential terminology concerns. Consistent with CDC guidelines, the focus of education for the infection control workforce is on core prevention strategies and then on supplemental strategies when the core strategies are not sufficient. Many of the practices in the Core Practices document are not evidence-based, which is not consistent with those applications of the term “core.” The Core Practices document is intended to capture basic infection prevention practices and to avoid restating them in every guideline. This concept is different from the idea of “core” as a fundamental practice associated with a specific topic area. In CDC materials and toolkits, “core” refers to practices for which there are higher levels of evidence and implementation is feasible. “Supplemental” refers to practices that may be supported by less evidence and may not be feasible in every care setting. The practices in this document could be called “fundamental” or “essential” to avoid confusion. The conversation regarding changing the document to “essential” rather than “core” was moved offline.

There is a need for education to embrace a wide range of healthcare personnel. The document introduction states that: “Healthcare personnel referred to in this document is all persons, paid and unpaid, in a healthcare setting having direct patient contact or potential exposure to patients and/or to infectious materials, including body substances, contaminated medical supplies, equipment, surfaces, or contaminated air. Healthcare personnel also includes persons not directly involved in patient care (e.g., clerical, housekeeping, volunteers) but who are potentially exposed to infectious agents that could be transmitted to and from healthcare personnel and patients.” The section on education and training should echo those ideas, perhaps expanding to state that non-clinical staff members should understand certain basics, appropriate to job responsibilities.

The table is intended to be freestanding and could be used effectively without the introductory text. It could refer to a page in the text or to job responsibilities in healthcare as previously defined. There are options for articulating the issues. The table includes a third column, which can emphasize certain points.

### Core Practice #3: Patient, Family, and Caregiver Education

- ☐ Provide infection prevention education to patients, family members, and others included in the caregiving network, as appropriate.

### Core Practice #4: Performance Monitoring and Feedback

- ☐ Monitor performance to enhance adherence to infection prevention best practices.
- ☐ Provide regular feedback of process and outcomes to staff performing the processes being monitored and to facility leadership.

## Discussion Points

The change “monitor adherence to infection prevention practices to enhance performance” was suggested. There was agreement among HICPAC with the change.

## Core Practice #5: Standard Precautions

- ☐ Use Standard Precautions to care for all patients in all settings. Standard Precautions include:
  - 5a. Hand hygiene
  - 5b. Use of personal protective equipment (e.g., gloves, gowns, face masks)
  - 5c. Respiratory hygiene/cough etiquette
  - 5d. Injection and medication safety

## Core Practice 5a: Hand Hygiene

- ☐ Require healthcare personnel to perform hand hygiene in accordance with CDC and HICPAC recommendations.
- ☐ Use an alcohol-based hand rub or an antimicrobial or non-antimicrobial soap for the following indications:
  - Before touching a patient
  - After touching a patient or the patient's immediate environment
  - After contact with blood, body fluids or excretions, and wound dressings
  - Before performing an aseptic task (e.g., placing an indwelling device, preparing an injection) or handling invasive medical devices
  - Before moving from a contaminated body site to a clean body site on the same patient
  - After glove removal
- ☐ Ensure that healthcare personnel perform hand hygiene with soap and water (an antimicrobial or non-antimicrobial soap) when hands are visibly soiled.

## Discussion Points

The document should specifically mention hand hygiene before touching a patient or before donning gloves. The Hand Hygiene Guidelines that were pulled forward in the 2007 Isolation Guideline do not include an explicit recommendation regarding hygiene before glove use. There is a recommendation for performing hand hygiene after glove removal, and it refers to hand hygiene before patient contact or contact with the environment. There are no recommendations for performing hand hygiene before donning non-sterile gloves. Recent literature included in the World Health Organization (WHO) Guideline specifies “regardless of glove use.” Some data suggests that hand hygiene is not necessary when gloves are worn. Common sense, however, would have a person clean his or her dirty hands. There is a perception that the application of gloves will protect the patient. The term “regardless of glove use” may address this problem. The intent in the Isolation and Hand Hygiene Guidelines was to recommend that hand hygiene should be performed before patient contact, regardless of glove use, but that is not how the guideline is being interpreted. Personnel are not performing hand hygiene before donning gloves because there is not an explicit recommendation to do so. The *Compendium of Strategies to Prevent Healthcare-Associated Infections in Acute Care Hospitals* refers to current literature and debate and addresses the topic as an unresolved issue.

The Core Practices document should not include a recommendation that is different from the guidelines on which it is based or reach beyond its fundamental principles without undergoing the process of a guideline update. This issue is important, but a number of researchers are considering it, and it is a current issue of debate. The statement should remain as it is for the purpose of the Core Practices document but can be expanded upon in the discussion column,



which can address gloving in more detail. The discussion could include references as suggested.

The section of the Core Practices on administrative support might include language to suggest that institutions, facilities, or programs may add additional requirements as they see fit. Some facilities, such as those that deal with heavily immunocompromised patients, might go beyond the recommendations in the document. The Core Practices document should remain at a level that is useful to a variety of institutions.

#### Core Practice #5b: Personal Protective Equipment

- ☐ Educate all healthcare personnel on proper selection and use of personal protective equipment (PPE) including the following:
- ☐ Wear gloves if likely to have contact with blood, body fluids, mucous membranes, non-intact skin or contaminated equipment
- ☐ Wear a gown to protect skin and clothing during procedures or activities where contact with blood or body fluids is anticipated
- ☐ Wear mouth, nose and eye protection during procedures that are likely to generate splashes or sprays of blood, respiratory secretions, or other body fluids
- ☐ Remove and discard PPE upon leaving the patient's room or area or completing a task that involves contact with excretions, secretions, blood or body fluids or contact with mucous membranes or non-intact skin.
- ☐ Ensure that healthcare personnel have immediate access to and are able to select, put on, remove, and dispose of PPE in a manner that protects themselves, the patient, and others.

#### Discussion Points:

Wording in the original document refers to “potential for contact.” The term “reasonable anticipation” is commonly used. OSHA requirements refer to “anticipated exposure to” certain materials. The terminology in this guideline should be as consistent as possible with existing guidelines.

#### Core Practice #5c: Respiratory Hygiene and Cough Etiquette

- ☐ Discourage visitors and healthcare personnel with symptoms of respiratory infection (e.g., fever and cough) from entering the healthcare facility.
- ☐ Help patients and essential visitors with symptoms of respiratory infection to contain their respiratory secretions by, for example, providing tissues and/or surgical masks and instructional signage or handouts at points of entry and throughout the facility.
- ☐ Separate patients with respiratory symptoms from other patients (e.g., place them into a separate examination room or as far from other patients as possible in the waiting room) as soon as possible after entry into the healthcare facility.

#### Discussion Points

Regarding the third point, the HICPAC liaison from the American Health Care Association (AHCA) commented that separating patients can be challenging for some of their constituency in long-term care and home settings. Compliance with the way it is currently worded may be impossible in some settings. In some facilities, patients with respiratory symptoms are separated, but if the only bed available is in a double-patient room, a person with pneumococcal pneumonia is not separated from someone with a wound infection, for example. As worded, the Meeting Minutes: Healthcare Infection Control Practices Advisory Committee  
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third point could be taken to a level that is pragmatically difficult. The addition of “if feasible” at the end of the sentence was suggested.

The guidelines should distinguish between droplet transmission and airborne transmission. If it is airborne transmission, then the patient should be separated physically. If it is droplet transmission, then three to six feet of separation are recommended. When someone presents to the emergency department, it is rarely possible to determine whether the symptoms are due to droplet-transmitted or airborne-transmitted illness.

The term “respiratory symptoms” may be too vague. The term could be changed to “symptoms of respiratory infection” so that the recommendation is more specific and does not include issues such as asthma exacerbation. The respiratory hygiene section in the Isolation Guidelines uses the term “undiagnosed, transmissible respiratory infections.” That phrasing teases out pneumococcal pneumonia.

The discussion of specific wording was taken off-line. The first point defines symptoms as fever and cough, and the second and third points refer to use of masks and/or tissues and to separating patients. Without more clarity, the recommendations could be misinterpreted. The phrase “strongly adhered to” is potentially problematic. The intent of the recommendations is clear, but the editing should take into consideration potential unintended consequences of different and potentially broad interpretations.

#### Core Practice #5d: Injection and Medication Safety

- ☐ Use aseptic technique when preparing and administering medications.
- ☐ Disinfect the access diaphragms of medication vials before inserting a device into the vial.
- ☐ Never administer medications from the same syringe to multiple patients, even if the needle is changed or the injection is administered through an intervening length of intravenous tubing
- ☐ Do not reuse a syringe to enter a medication vial or solution.
- ☐ Do not administer medications in single-dose or single-use vials, ampules, or bags or bottles of intravenous solution to more than one patient.
- ☐ Do not use fluid infusion or administration sets (e.g., intravenous tubing) for more than one patient.
- ☐ Dedicate multidose vials to a single patient whenever possible. If multidose vials are used for more than one patient, restrict the medication vials to a centralized medication area and do not bring them into patient treatment areas (e.g., operating room, patient room/cubicle).
- ☐ Dispose of used syringes and needles at the point of use in a sharps container that is closable, puncture-resistant, and leak- proof.
- ☐ Adhere to federal and state requirements for protection of healthcare personnel from exposure to bloodborne pathogens.

#### Discussion Points

The guideline should refer to wearing a mask when performing an epidural.

#### Core Practice #6: Transmission-Based Precautions

- ☐ Implement additional precautions (i.e., Contact, Droplet, and/or Airborne Precautions) in situations where contact with the patient, their body fluids, or their environment presents a substantial transmission risk despite adherence to standard precautions.

#### Core Practice #7: Preventing Cross-Contamination of Supplies and Equipment

- ☐ Separate clean from soiled equipment in patient care areas and during patient care activities.
- ☐ Do not share patient care items between patients unless the items have been cleaned and disinfected between use and are labeled as appropriate for multiple patient use.
- ☐ Store patient care supplies and equipment in clean storage spaces that minimize opportunities for contamination.
- ☐ Do not reuse or share between patients any items packaged or labeled as single patient use unless reprocessing of the item is FDA-approved.
- ☐ Store patient care items in areas that are free from conditions that may compromise the item (e.g., contact with water).

#### Discussion Points

Because the recommendation is intended to be broadly-reaching, it may need to clarify the patient care items. Many outpatient settings now use disposable blood pressure cuffs. The point does not intend to recommend cleaning and disinfecting cuffs between patient visits; if so, it would represent a massive and unlikely change. The recommendation could be misinterpreted to state that even in low-risk situations, all items should be cleaned and disinfected between patients. Referring to “single-use” may make the point more clear. The wording could refer to items that pose a risk of transmission. Other phrasing suggestions included “when feasible” and “when appropriate,” but both were potentially problematic. The definitive wording will be resolved by the working group. They will confirm the wording in the source guideline.

There was discussion regarding what is meant by “patient care activities” in the first point. The sentence could end after “patient care areas.” This core practice refers to equipment in the environment. Cross-contamination in the patient care setting is not clearly addressed.

The overall guideline is moving away from location and toward provision of care, and the language should be consistent throughout the document.

#### Core Practice #8: Environmental Hygiene and Disinfection/Sterilization of Equipment

- ☐ Assign responsibility for routine cleaning and disinfection to appropriately trained healthcare personnel.
- ☐ Follow manufacturer’s recommendations for use of cleaners and EPA-registered disinfectants (e.g., amount, dilution, contact time, safe use, and disposal).
- ☐ Follow the equipment manufacturer’s instructions to ensure that reusable medical equipment (e.g., blood glucose meters and other point-of-care devices, surgical instruments, endoscopes) is cleaned and appropriately reprocessed prior to use on another patient.

## Discussion Points

The importance of monitoring the thoroughness of cleaning in addition to assigning responsibility is captured in the section of the document focused on performance monitoring. Monitoring is an important aspect of each of the recommendations and may not need to be specified, as it falls under the administrative responsibilities of the program or facility to teach and to monitor performance. However, the monitoring of disinfection and sterilization of equipment is a special kind of monitoring. The other point was amended to state, “monitor adherence to infection prevention practices,” and cleaning is not necessarily included in care practices. The recommendation regarding performance monitoring could include verbiage to address not only infection prevention and control practices, but also practices that may impact transmission of infection.

The third recommendation points out a controversial issue for infection prevention, as many manufacturers do not test all common products for cleaning. The discussion might allow for latitude when a hospital’s oversight committee or infection prevention committee deems that a single product will be sufficient and there is not knowledge regarding whether a product cannot be used for a purpose. This issue has arisen regarding blood glucose meters. There is a range of recommendations from manufacturers. These issues could be addressed in the discussion rather than in the elements themselves.

The phrasing “ensure that the reusable equipment is appropriately cleaned and disinfected” was suggested.

## Core Practice #9: Invasive Medical Devices

- ☐ During each healthcare encounter, assess the medical necessity of any invasive medical device (e.g., vascular catheter, indwelling urinary catheter) in order to identify the earliest opportunity for safe removal.
- ☐ Ensure that healthcare personnel adhere to recommended insertion and maintenance practices.

## Core Practice #10: Occupational Health

- ☐ Develop mechanisms that enable healthcare personnel to either receive immunizations or have documented immunity against vaccine-preventable diseases as recommended by the CDC’s Advisory Committee on Immunization Practices (ACIP) and required by the U.S. Occupational Safety and Health Administration (OSHA).
- ☐ Develop processes to encourage healthcare personnel to refrain from reporting to work when they develop signs or symptoms of acute infectious illness (e.g. fever, cough, diarrhea, vomiting, or draining skin lesions) to prevent spreading their infections to patients and other healthcare personnel.
- ☐ Develop systems to encourage healthcare personnel to report signs, symptoms, and diagnosed illnesses that may represent a risk to their patients, coworkers, and their communities to their supervisor or healthcare facility staff who are responsible for occupational health.

## Discussion Points

Ms. Pugliese asked HICPAC for feedback regarding how frequently the core practices should be reviewed and what might trigger a re-evaluation of an existing core practice or the inclusion of a new core practice. This guideline could be a living document, initially published and housed on the CDC website in the public domain.

There was support for the idea of creating a process by which ideas can be submitted regarding issues that need to be addressed. Those ideas can come from a variety of sources, including HICPAC, and can be reviewed at regular time intervals. A basic template could be developed to include information that would be needed to suggest a new recommendation or a change to an existing recommendation. The website can include a comment box, which would yield comments on a rolling basis, or they could call for comments on a yearly basis and discuss them at a meeting.

The frequency of review should be in line with the other guidance documents. Because of their pace, it is likely that if they collect comments once per year, they will likely not finish edits based on collected comments in one year before the next call for comments begins. The recommendations could be reviewed every five years or as needed, as questions arise or issues change.

Given its nature, this document is not likely to require updates based on advances in science. Other guidance documents are more likely to be changed based on evolving research. When the document is published, it will be important to consider feedback provided to DHQP, which will indicate whether any aspects of the guidance should be revisited.

As additional guidelines are reviewed and published, they may more points may be added to the core practices. For instance, the 1999 SSI Guidelines recommendations that were discussed are basic practices, and they could be included as a sub-section of the Core Practices Guideline.

## Next Steps

The HICPAC working group will draft a White Paper to include a summary of the development process, the importance of the core practices, and recommendations for implementation. The paper will address whether the guidance should be utilized for regulatory or inspection review and the kinds of professional groups that may share the guidance with their members and develop implementation guides. CDC will review the recommendations and ensure that they are consistent with other posted CDC guidelines. Ultimately, the Core Practices Guidance will be posted on the CDC website with links to the White Paper. Any organization or journal will have the option to publish the White Paper as-is, or to write their own editorial and link to the Core Practices. CDC has a number of avenues to announce the Core Practices. HICPAC members Ms. Carrico, Ms. Pugliese, and Dr. Yokoe will do that work and forward it to the rest of the working group.

## Discussion Points

One of the benefits of this document will be to push these practices into areas where they are not generally seen. The dissemination should recognize that care is moving from hospitals into different care settings. It is important to engage with those groups.

The Safe Injection Practices Coalition includes a number of organizations that represent many non-acute sites.

The document should be disseminated to the regulatory community for hospitals and long-term care facilities, as well as medical boards, dental boards, and nursing boards. These groups often refer to CDC recommendations in their recommended professional guidelines.

CDC is excited to have these guidelines. They have worked with CMS and other partners to incorporate them across the spectrum of care, within policy as well as within individual facilities. The Core Practices Guideline will be incorporated into CDC's ongoing efforts to build awareness of infection control in a range of settings where healthcare is provided.

## **Outbreaks Related to the Use of Duodenoscopes and Future Directions**

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Endoscopic retrograde cholangiopancreatography (ERCP) is a procedure for evaluating and treating diseases involving the biliary and pancreatic ducts. It is often a necessary and potentially lifesaving procedure that is performed using a duodenoscope, which enters through the mouth and travels down the gastrointestinal (GI) tract into the small intestine. Accessory devices make a sharp turn at the tip from the duodenoscope to enter the biliary or pancreatic duct. This movement is facilitated by the elevator mechanism, a mechanical lever on the distal tip of the duodenoscope. This mechanism is a unique feature of the duodenoscope. It is hinged on one end and is operated by connecting wires that run through a channel called the elevator wire channel.

Like other types of endoscopes, duodenoscopes contact the mucous membranes and are considered semi-critical devices. Current CDC/HICPAC recommendations for reprocessing these devices consist of manual cleaning followed by high-level disinfection, which should kill all microorganisms except for spores when a high number of bacterial spores is present.

Routine microbiologic surveillance of reprocessed endoscopes, specifically duodenoscopes, is somewhat controversial. Routine culturing of reprocessed duodenoscopes is not currently recommended in US guidelines, aside from in an outbreak situation. However, such practice is recommended in other countries, such as Australia, New Zealand, and countries in Europe.

Duodenoscope reprocessing can be challenging for several reasons. The intricate design of the elevator mechanism can make it difficult to access all surfaces, grooves, and crevices during manual cleaning. In addition, in the older models of these scopes, the elevator wire channel is opened or unsealed. In order to clean or disinfect the channel, the necessary flushing pressure is not reliably achieved by most automated endoscope reprocessors (AERs). Therefore, manual flushing of the channel is required. To address this issue, newer duodenoscope models have a sealed elevator wire channel that is not exposed to patient materials or fluids and which does not require flushing.

Bacterial outbreaks due to improperly reprocessed duodenoscopes are well-documented. The outbreaks are usually due to lapses in recommended reprocessing procedures or to defective duodenoscopes or problems with the reprocessing equipment. In 2013, an outbreak of carbapenem-resistant Enterobacteriaceae (CRE) was reported in Illinois that was linked to ERCP. No clear breaches in duodenoscope reprocessing or related issues were identified in this outbreak.

The Illinois outbreak was detailed in a recent issue of the *Morbidity and Mortality Weekly Report* (MMWR). The initial investigation revealed that six of eight patients with New Delhi metallo- $\beta$ -lactamase (NDM)-producing *Escherichia coli* (*E. coli*) who were treated at the same hospital in Illinois had all undergone ERCP. A closer review of the procedure and duodenoscope used was conducted. Both NDM-producing *E. coli* and *Klebsiella pneumoniae* carbapenemase (KPC)-producing *Klebsiella pneumoniae* isolates were recovered from cultures taken from the distal tip of the duodenoscope after the scope had been reprocessed.

A careful review of the facility's duodenoscope reprocessing procedures was performed by multiple parties, and no clear breaches in reprocessing were identified. Certain products or items used by the hospital for reprocessing were not specifically recommended by the manufacturer; however, the products were marketed for that brand of duodenoscope or were identical to products on the manufacturer's compatible list. The hospital adhered to the manufacturer's duodenoscope service schedule. The duodenoscope and the AER were evaluated by their respective manufacturers, and no defects or improper functioning were identified.

Patients who were exposed to one of three implicated duodenoscopes were notified for CRE screening. Twenty-seven of eighty-nine patients who returned for screening were found to be positive for NDM-producing *E. coli*. Patient isolates and the *E. coli* isolate recovered from the duodenoscope were highly related by pulsed-field gel electrophoresis (PFGE). Further testing of the NDM-producing *E. coli* and the KPC-producing *K. pneumoniae* isolates recovered from the duodenoscope was performed. There were no survivors when challenged against Metricide™ OPA Plus, confirming that ortho-Phthalaldehyde (OPA) was effective against the organisms. The organisms were also not more likely to form biofilm than other organisms.

In response to the outbreak, CDC organized a conference call in February 2014 with key stakeholders and leading experts from a range of associations and partners to review findings from CDC-led and other public health investigations of outbreaks related to duodenoscope use. Additionally, the call identified issues and challenges associated with duodenoscope reprocessing, including adherence to recommended procedures and issues associated with the procedures themselves. They discussed approaches to addressing evidence gaps and improving reprocessing of duodenoscopes.

The group concluded that the extent of the problem with duodenoscopes might be underestimated. Its true magnitude is not known, and the transmission of more susceptible organisms may not be recognized. There were no breaches in reprocessing in the Illinois outbreak, but the participants in the conference call noted general failures of duodenoscope reprocessing due to unrecognized lapses in reprocessing as well as to intrinsic issues with these types of endoscopes. For instance, there may be inadequate cleaning or drying due to a lack of appropriate training of responsible personnel and/or regular facility review of practices. There is a lack of standardized or required preventive maintenance schedules. Design issues with the duodenoscopes may make cleaning difficult, and no standardized process to assess cleaning has been validated.

Since the call, CDC is continuing discussions with stakeholders and leading experts in the field. CDC has piloted a protocol for culturing duodenoscopes, focusing on the elevator mechanism, and is continuing to provide ongoing technical assistance to facilities and health departments in investigations of outbreaks related to duodenoscope use. CDC is also working with external partners to address the problem. CDC is developing interim guidance for facilities that perform procedures with duodenoscopes. The draft guidance under consideration includes four steps:

- ☐ Regularly review recommended duodenoscope reprocessing procedures.
- ☐ Perform microbiologic surveillance of reprocessed duodenoscopes.
- ☐ Repeat the reprocessing of any duodenoscope with positive cultures and further evaluate if persistently positive.
- ☐ Inform patients of risk of bacterial transmission associated with duodenoscope procedures.

The review of recommended duodenoscope reprocessing procedures includes the following elements:

- ☐ Ensure personnel performing duodenoscope reprocessing are trained with competency verification.
- ☐ Regularly review reprocessing procedures to ensure strict adherence to manufacturer instructions.
- ☐ Ensure that the elevator mechanism is thoroughly cleaned and visibly free of debris.
- ☐ Ensure that the duodenoscope channels and the elevator mechanism are thoroughly dried prior to storage to prevent biofilm formation that could result in persistent contamination.

Although routine microbiologic surveillance of reprocessed endoscopes is not part of current US national guidelines, given concerns with duodenoscopes, it is important to monitor the adequacy of duodenoscope reprocessing regularly, such as by culturing following reprocessing:

- ☐ The frequency of microbiologic surveillance may vary. It may not be feasible to sample a duodenoscope after every reprocessing, so facilities might consider performing periodic microbiologic surveillance based on the frequency of duodenoscope use.
- ☐ Facilities should culture at least the distal tip where the elevator mechanism is located, and the unsealed elevator wire channel, if applicable.
- ☐ Given that duodenoscope procedures are critical, and patients who need the procedure should not be delayed, duodenoscopes do not need to be held from use while culture results are pending; however, duodenoscope procedures subsequent to obtaining cultures should be clearly documented so that patients can be identified later on, if needed.

Regarding the interpretation of the results of post-reprocessing duodenoscope cultures, there should not be any pathogenic bacteria detected following reprocessing. Duodenoscopes are not sterile instruments, so small numbers of relatively non-pathogenic bacteria may occasionally be detected. While there is no national consensus regarding the level of non-pathogenic bacterial growth that might constitute a risk to patients, a detection of more than 10 colony-forming units (CFU) of non-pathogenic bacteria per distal tip or channel culture, or repeated finding of positive cultures of non-pathogenic bacteria from the same duodenoscope regardless of the number of CFU, might warrant further evaluation.

Regarding the use of non-culture methods to assess the adequacy of duodenoscope reprocessing, there has been limited experience using Adenosine triphosphate (ATP) assays to



detect organic residuals following manual cleaning; however, additional evidence and experience with using ATP for this purpose might be needed before it can be widely recommended for routine use.

Suggested remedial actions for reprocessed duodenoscopes with microbial growth detected are:

- ☐ Any reprocessed duodenoscopes with pathogenic bacteria detected or more than ten CFU of non-pathogenic bacteria should be reprocessed again. Repeat cultures should be obtained.
- ☐ Duodenoscopes that are positive should be held from use until repeat cultures are negative for pathogenic bacteria or have less than ten CFU of non-pathogenic bacteria.
- ☐ In a situation in which a duodenoscope is persistently positive, facilities should review reprocessing procedures and consider evaluation of the duodenoscope for defects. Facilities might consider sending the duodenoscope to the manufacturer for more thorough evaluation.

For patients undergoing duodenoscope procedures, current informed consent mentions a risk of infection, but the assumption is that any organism causing the infection comes from a patient's own flora. Based on what is now known, it is suggested that facilities inform patients of the small risk of patient-to-patient bacterial transmission associated with duodenoscope procedures, including the rare possibility of transmission of multidrug-resistant organisms.

### Discussion Points

The suggested guidance regarding routine culturing are consistent with guidelines in Europe, New Zealand, and Australia regarding performing microbiologic surveillance. The intervals and frequency of sampling vary among the guidelines. There is also "leeway" so that facilities can make their own decisions. CDC studied these guidelines to determine whether they will be applicable in the US. There is no national consensus regarding a cutoff level for non-pathogenic bacteria in the US, but CDC settled on the cutoff of ten CFUs after discussions with US experts and after reviewing international guidelines.

When a scope is culture-positive, the document should address how to handle patients who have had that scope used on them previously. For instance, should there be "look back" notification, and for how long?

The guidance may need to provide a detailed list to help laboratories distinguish pathogenic from non-pathogenic bacteria. The cultures will yield a wide array of results, including environmental gram-negatives. More laboratories are utilizing matrix-assisted laser desorption/ionization (MALDI) and will identify species that they may not know how to address.

HICPAC felt that these recommendations, while perhaps justified, represent a radical change in the handling of endoscopes. Contamination of endoscopes and difficulty of cleaning them, particularly multi-channel endoscopes and scopes with elevator mechanism, is not a new problem.

There was discussion regarding why these recommendations are being suggested now, given that they come as a result of one outbreak in one institution. The involvement of CRE and KPC is concerning, but the outbreak could have been due to a fault of the mechanical design of the scope or of inadequate cleaning processes. The Illinois outbreak is different from other outbreaks related to duodenoscopes, which were associated with a reprocessing lapse or breach. In Illinois, no clear breaches in the reprocessing were identified. Conducting a retrospective review of practices is a limitation of field investigation; however, in this case, the hospital staff members were diligent and forthright when sharing information. They reviewed their own practices in-house and also asked the duodenoscope manufacturer and CDC team to come on-site to review their practices. It is possible that there was a lapse in reprocessing that was corrected before CDC arrived to investigate.

The new draft guidance is also prompted by the fact that the organism associated with the outbreak is unusual and highly drug-resistant bacteria. It could represent the “tip of iceberg” of the possibility for transmission of bacterial organisms because of issues of reprocessing duodenoscopes. Given this era in which antimicrobial agents are limited for treating highly drug-resistant bacteria, there is a concern with outbreaks such as this one.

CDC is concerned about other endoscopes, so an extension of the recommendations to other types of endoscopes that have similar channels and characteristics is possible. Currently, the outbreaks of which they are aware are associated with these types of duodenoscopes, so their first focus is on those devices.

HICPAC suggested that CDC consult with experts in the US and abroad to learn about the frequency of positive cultures under the guidelines in other countries and whether they have identified which of the extra steps in reprocessing should be performed. If that step can be identified, then it can be recommended. Forcing screening evokes concerns about the amount of screening that will be required for hundreds of thousands of scopes. Authorities in other countries could ask their hospitals specifically about this kind of scope and the testing results. It would also be possible to ask about practice changes that have been implemented as a result of positive cultures, and then to learn whether positive cultures have been found with other scopes. If the recommendations in other countries are no different from the US recommendations, then the other countries have not identified something from culturing that changes their screening practice. In that case, screening may not be the best approach. If the other countries have changed their protocols in response to culturing, then that change should be considered. If not, more research or a pilot should be conducted.

There was discussion regarding the need to develop an estimate of the national annual cost of implementing the suggested recommendations. The draft recommendations are to continue using the scope, pending the culture. That recommendation should depend on the frequency of isolation of pathogenic organisms. If the frequency of isolation is high, it is not advisable to use the scope pending culture results. Facilities may be required to purchase additional scopes, as many of them will be nervous to use a scope before culture results are received. The issue of written consent will be extremely complicated, especially if the scopes are used before the culture results are available. If cultures are conducted every three months, then patients who have been exposed to the scopes will have to be retrospectively contacted, or their charts reviewed. HICPAC’s input will be helpful in this area. Patients need ERCP procedures, and those needs must be balanced with the awareness that cultures are pending and there is a potential for exposure.

A large number of endoscopies are performed in facilities that do not necessarily have a microbiology laboratory. It will be more difficult to conduct this culturing in freestanding facilities,

which typically send cultures to outside laboratories for evaluation. The cultures from scopes are not patient specimens—they are environmental specimens. They may not be able to be processed at the hospital microbiology laboratory. It is also not clear whether the culturing laboratory will have sufficient ability in quantitative cultures at the low level of ten or fewer CFUs. The order of magnitude is likely to be inaccurate.

There should be an investigation of whether ATP testing will be sufficient, as ATP testing is much easier and faster to conduct. Releasing this guidance for duodenoscopes is the beginning of a “slope” because of the large number of similar devices.

More data are needed. Some reports from individual facilities have been published regarding the frequency of culture positivity following reprocessing. In CDC’s discussions with experts, they learned that many facilities go through a recommended drying step, but they may not spend the amount of time necessary to ensure that essential parts of the duodenoscope are completely dry before storage. These steps are emphasized in the draft guidance. In many areas, facilities do not follow the manufacturer’s instructions, and the Illinois facility did not adhere strictly to the manufacturer’s instructions with regards to certain items used for cleaning the duodenoscope (e.g., brushes). The deviance may not have made a difference in the outcome, but it did occur.

It is important to gather information about current practice in hospitals and other facilities that use endoscopes. After the practices are identified, a recommendation could be made for ongoing monitoring of all scopes and ensuring that the proper steps are followed.

HICPAC suggested shifting the focus to why the duodenoscope and the elevator mechanism are different and to testing contaminated scopes to determine whether there are better ways to clean them. The sealed elevator wire channel scopes were implicated in the outbreaks. Is the problem the elevator mechanism or that facilities are not following all of the cleaning processes? If the elevator mechanism cannot be reprocessed, then they will have the rationale to pursue an intensive, aggressive culturing strategy.

Other outbreaks of CRE involving duodenoscope procedures have occurred. Those outbreaks implicated duodenoscope manufacturers other than the manufacturer in the Illinois outbreak, and they were not unique to one facility or one manufacturer. There have been reports of contamination in other types of endoscopes; however, those outbreaks are associated with an identified reprocessing breach. Because no clear breaches were identified in the duodenoscope-related outbreaks, the question arises whether some unique aspect of duodenoscopes is leading to the outbreaks. The experts with whom CDC consulted agreed that duodenoscopes are more difficult to reprocess. When facilities reprocess, they can follow checklists, but duodenoscopes may require more rigorous manual cleaning, and it is not clear how to ensure that those procedures are consistently followed. They must also ask whether the cleaning processes are sufficient, or whether an aspect of the duodenoscope design makes it difficult to clean.

There was discussion regarding antibiotic use in patients who were involved in the outbreak and unique aspects of the facility. CRE was not endemic in the facility. The isolates recovered from positive patients matched the isolate that was recovered from the duodenoscope, suggesting that transmission occurred from the procedure to those patients. Since the Illinois outbreak, CDC has been made aware of at least four other CRE outbreaks related to ERCP. The CRE organism was recovered from the duodenoscope in at least one of the other outbreaks, and it matched the patient isolates.

HICPAC recognized the problem but cautioned against making a recommendation that has uncertain goals, uncertain frequency, involves contact tracing, and has other ramifications. Steps should be taken to gather appropriate information to determine the right solution, which may not be culturing.

The duodenoscope manufacturers should be part of the solution if this problem is associated with the scopes that have the particular mechanism, which may be unsafe because they cannot be easily disinfected. Other designs may be needed. At what point should the use of the instrument be discontinued because it cannot be safely disinfected? The FDA has been involved with this issue. The manufacturer of the duodenoscope was involved in the investigation after the Illinois outbreak. CDC can explore further how to work with industry and other federal agencies regarding the scope design. The problem may be worsening as the device channels are getting smaller as the endoscopes are “improved.” Facilities need interim guidance while other solutions are pursued.

It is not clear whether additional culturing will improve patient safety. Culturing identifies contamination after the fact and does not lead to solutions for addressing it. It is not clear how to communicate the risk to patients, and in fact the risk to patients is not clear. The problem may have persisted for a long time and may not require acute action to solve it.

HICPAC was encouraged to think about other measures and solutions, other than randomized trials, to prevent these outbreaks from occurring in the future. Feedback would be appreciated from HICPAC members who have endoscopes in their facilities and can conduct testing on them. Future calls with experts will include a HICPAC member not only to hear the experts’ feedback, but also to provide suggestions for moving forward.

HICPAC felt strongly that the onus is on the device manufacturers to solve this issue. It will be difficult to investigate this problem at the hospital level, and the implications will be significant if a hospital cultures even a single scope. Device manufacturers, however, can do this work. Manufacturers should consider the design of the scope and focus on the standard practice of using high-level disinfection as opposed to sterilization. A scope that can be sterilized should be designed.

## **Update on Catheter-Associated Urinary Tract Infection Prevention and Surveillance**

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The HHS Action Plan targets a 25% reduction in CAUTI by 2014. National surveillance data indicate that the goal is not on track. This issue was noted in the *National and State HAI Progress Report* released by CDC in March 2014, based on 2012 data, showing an increase of three percent in CAUTI incidence. A 9% increase was indicated in intensive care unit (ICU) locations reporting, and a reduction of fourteen percent was shown in the wards reporting. The mandate is currently only for ICUs, so the data from the non-ICU locations are not completely representative.

From 2010 to 2013, the Standardized Infection Ratio (SIR) was been increasing, particularly after the 2012 reporting mandate for ICUs. There is a clear split in the data that show better results in non-ICU locations. Since 2009, the Device Utilization Ratios (DURs) are essentially flat in non-ICU locations and have reduced from approximately 70% to approximately 60% in

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ICU locations. As of 2013, ICU locations have an aggregated DUR of 60%, and ward locations report a 17% DUR.

Now that more data are available, CDC is using those data to target prevention efforts. The TAP report ranks facilities by excess numbers of infections above a given benchmark, which can be set at a national, state, or group target level. The TAP report function will be built into the National Healthcare Safety Network (NHSN) application in January 2015 so that users and facilities can create their own TAP reports.

Over 4700 hospitals report CAUTI data to NHSN. The TAP strategy allows for targeting of hospitals with the highest numbers of excess infections, and technical assistance is provided to the hospitals to assist them in their efforts to reduce their infections. This technical assistance is provided through CDC partners, including Hospital Engagement Networks (HENs), Quality Improvement Organizations (QIOs), the Comprehensive Unit-based Safety Program (CUSP), and others who may have access to data through a mandate or a data use agreement.

The metric by which facilities are ranked is called the Cumulative Attributable Difference (CAD). It illustrates the excess number of infections and its formula is the observed number of infections minus the expected number of infections. The expected number can be set at any level, depending upon the SIR target, which can be chosen based on the goals of a state, organization, prevention group, or national levels. The lower the target SIR, the greater the excess number of infections will be.

Facilities are ranked by the CAD in descending order in the reports. The report also splits the data of ICU and non-ICU locations and includes data on device utilization and pathogens, with their percentages of infection. CDC received feedback from QIOs that if an organization has a small number of facilities, then it is preferable to report the actual number of isolates in each category as opposed to the proportion. The SIR is included on the report and is related to the CAD, but the CAD provides additional information about the actual burden of infections. For example, a facility may have a low SIR, but if it is a large facility, it might have a large burden of excess infections. A small facility may seem to have a high SIR, but that number could represent a small number of infections because of the low number of patients at risk.

A unit-level TAP report is also available. It ranks facilities by their total excess CAUTIs and also ranks reporting locations within each facility. The report includes the location, location type, total number of CAUTIs, device days, DUR, CAD, SIR for that location, and the pathogens for that location. The unit-specific report is helpful not only to facilities, but also to QIOs that conduct site visits at facilities.

Preliminary analysis has been conducted to determine how many hospitals, and which hospitals, should be targeted to reduce excess infections to reach national targets. The data show that the national CAUTI SIR is 1.057, with 3639 facilities reporting. 1578 hospitals have SIRs above the national target of .75. If their excess CAUTIs are eliminated, they will achieve a national SIR of .62. In order to reach the national target of .75, only 281 hospitals need to be targeted to eliminate 9884 CAUTIs. If their efforts only focus on ICU data, since all facilities are not reporting from non-ICU locations, then 492 hospitals should be targeted to prevent 9884 excess CAUTIs to reach a national level of .75. The CAD is a highly efficient means for reaching the national goal and can be immensely helpful for CDC and other organizations.

The 281 hospitals for targeting are classified as general hospitals. They represent a mix of teaching status, but the majority of them are major teaching hospitals. Most of the hospitals

have bed sizes ranging from 200 to 1000 beds. The CAD ranges from approximately 20 to slightly more than 150 per hospital.

CDC is developing strategies to assist the targeted hospitals with their prevention efforts in a number of ways. One of their first steps is to determine whether the targeted hospitals are members of existing prevention collaboratives or QIOs that are already working to prevent CAUTI. In some cases, CDC may reach out directly to the hospitals and connect them to an organization. CDC is also working with partners to assist hospitals in running TAP reports and targeting and implementing their prevention efforts. CDC is also assisting them with recruitment. Further, CDC is exploring other potential partnerships and how to use the TAP reports for prevention. These efforts may include working with accreditation organizations to help them use the TAP strategy to target their infection control assessments and surveys. The state of Tennessee has been successful in using the TAP strategy to show hospitals exactly how many infections they need to prevent to reach a given SIR goal.

CDC worked with CMS to pilot the TAP strategy with seven QIOs. The QIOs were recruited based on the national TAP report, which showed hospitals needing assistance that are part of QIOs. The timeline for the project was April – July, 2014. The objective of the pilot was to determine the feasibility of having the QIOs create their own TAP reports for their member hospitals, initially focusing on CAUTI. The project also focused on piloting and refining tools to assess the barriers to prevention in the targeted hospitals.

The pilot process began with creating instructions and Statistical Analysis System (SAS) code. A live demonstration was created via Webinar. All seven QIOs successfully ran their TAP reports and provided feedback on improving the reports' format and data. CDC made modifications accordingly, which will be incorporated into the NHSN application. CDC ran the report simultaneously to ensure that the QIOs got accurate results. CDC worked with each QIO to help them target facilities or units. There were few "surprises" in the findings, as the QIOs were familiar with most of their member hospitals. The QIOs discovered some outlier units in the unit-specific reports, which included details that were not clear just from the facility-level data.

CDC then drafted a facility CAUTI assessment tool, which the QIOs reviewed. Based on that feedback, CDC revised the tool. The QIOs used the tool in some of their site visits at the targeted facilities and provided qualitative feedback. After multiple revisions, the result is a strong, working assessment tool. The ultimate goal is to link the tool to implementation guidance and to create a scoring system for the tool. The tool is arranged in domains for CAUTI prevention. If a facility has gaps in the domains, the tool will direct it to existing resources.

The facility assessment tool is meant to be an initial assessment, not a "deep dive." Its goal is to identify gaps in prevention. Its general domains are:

- ☐ Infrastructure, capacity, and processes, which incorporates leadership, training, competency assessments, and audits and feedback.
- ☐ Appropriate indications for urinary catheter insertion.
- ☐ Timely removal of urinary catheters.
- ☐ Aseptic urinary catheter insertion.
- ☐ Proper urinary catheter maintenance.
- ☐ Preventing candiduria and detection of asymptomatic bacteriuria.

The feedback from the seven QIOs was highly convergent. All of the QIOs agreed that more than one respondent should be interviewed at each facility or unit. These respondents should represent different levels in the organization. These interviews will reveal differences in

awareness, knowledge, and perceptions, which can be “eye-opening” to the facility and to the QIO. The QIOs also stressed that they are not always received “with open arms” at facilities, but it is important to establish an atmosphere of partnership and collaboration. When they explain that they are there to assist and that the visit is not meant to be punitive, then they are received very well most of the time.

The QIOs indicated that the questions should utilize frequency scales for response choices, as opposed to yes/no answers. The QIO feedback also focused on the need to clarify the meaning of terms, particularly “engage,” “audit,” and “competency assessments.” The QIOs also provided specific advice regarding how to clarify the language and improve the questions and flow of the tool.

The major themes of the feedback were:

- ☐ The tool improved the sharing of resources and communication across sites and facilities.
- ☐ The process helped to prioritize intervention and improvement opportunities.
- ☐ The tool enhanced the targeting of educational gaps, improving knowledge and awareness of practices and policies at the facility as well as the individual staff level. The assessment provided frequent “teaching moments.”
- ☐ The assessment was “thought-provoking” and “an eye-opener.”
- ☐ The pilot served as a “real-time performance improvement” effort and often led to specific actions by the hospitals. Rather than a one-time action, it can serve as a “continuous tool for improvement.”
- ☐ The assessment itself frequently led to specific actions and interventions at hospitals. For example, one facility decided “to target unit-specific educational opportunities during Skills Day.”

Additional qualitative feedback showed that the assessment tool and the TAP reports allowed facilities to target resources to units of need. The assessment also encouraged facilities to think further about how they can prevent CAUTIs. One facility identified through the assessment that they have no method of ascertaining whether personnel inserting catheters are properly trained in aseptic technique. The assessment also indicated that “not everyone is on the same page at the same facility” and spurred dialogue. Another QIO indicated that a hospital learned that they need to engage physicians, which led to the creation of a physician-led committee to oversee CAUTI prevention efforts.

The goals for expanding the TAP strategy are to:

- ☐ Continue to work with CMS to expand the TAP approach to additional QIOs in the eleventh scope of work, which will begin in August 2014
- ☐ Develop similar assessment and implementation tools for *C. difficile* infection (CDI) and CLABSI
- ☐ Create an integrated, modular tool for all HAIs
- ☐ Engage with additional group users with access to data, including HENs and state health departments

The source of the CAUTI problem is the urinary catheter. Of healthcare-associated urinary tract infections (UTIs), 70% to 75% are associated with catheters and 95% are in ICUs. Non-infectious complications such as urethral strictures and erosion, hematuria, discomfort and pain, and restriction of activities are common.

## Discussion Points

HICPAC's input is important as this work progresses. DHQP is focusing not only on gathering data, but also on generating data that will help hospitals. Providing concrete data on numbers of infections, places where they occur, and tools for addressing the problems is important without duplicating local efforts. CAUTI represents only the first problem that they will address.

There is a strong sentiment among clinicians not to send urine cultures, particularly in ICU patients with catheters, because the perception is that sending too many cultures will result in too many positive results. A measure of urinary culture utilization may counteract that event. The surveillance definitions will take this problem into account. DHQP is working with partners to examine urine culturing rates and how they might impact CAUTIs and other outcomes.

### **Standardized Utilization Ratio (SUR) Metric: Indwelling Urinary Catheters**

**Alison S. Laufer, PhD**

**DHQP, NCEZID**

**Centers for Disease Control and Prevention**

The DUR is the proportion of total patient days on which an indwelling catheter is used. The goal of the SUR metric is to help facilities target their prevention efforts using their NHSN data and to help identify locations where device utilization might be improved. Prolonged catheterization is one of the main modifiable risk factors for CAUTI. The SUR models all facility-level and unit-level data that is collected by NHSN facilities. SUR is a summary measure that can be used as a comparative metric. Eventually, this method will be applied to the use of other devices, such as central lines and ventilators, as well as to antibiotics.

The metric development process began with an examination of the distribution of catheter device utilization. There is a wide distribution of DUR, which suggests that there is room for improvement. Variables under consideration for development of the SUR metric model included only those already collected in NHSN for CAUTI reporting:

- ☐ Location type
- ☐ Medical school affiliation
- ☐ Unit bed size
- ☐ Facility bed size
- ☐ Facility type

Using 2012 data, pooled DURs were modeled to identify a parsimonious model that fits the data in order to calculate the SUR. For example, if a single Medical/Surgical ICU has a major teaching medical school affiliation and 60 beds per unit, with a total of 200 beds in the facility, the predicted DUR will be .6. If there were 750 patient days at the unit during the time period of interest, the predicted DUR is multiplied by 750 patient days to calculate that the predicted number of catheter days is 450. This figure can be compared to the observed number of catheter days during the time period of interest to calculate the unit's SUR. If the example unit has 500 observed catheter days, then the SUR is 1.11 and therefore higher than predicted. SUR can then be used as a comparative metric to determine how catheter use at this unit compares with other units.

The model has some limitations. For example, it only uses data currently collected in NHSN and does not include patient-level data or data on the number of insertions or duration of catheterization. Therefore, it is not possible to discern the difference between, for example, two



patients that have catheters for 15 patients apiece, and 15 patients that have catheters for two days apiece.

The metric is still under development, but it will be submitted it to the National Quality Forum (NQF) for endorsement in 2015. Further, the metric could be included in future HAI reports and could be incorporated into NHSN to enable facilities and groups to evaluate their summarized catheter utilization. Facilities and groups may be able to target their efforts to reduce prolonged catheterization. The metric will be re-evaluated in 2016 after the 2015 NHSN re-baseline and will follow the NQF re-evaluation schedule if it is endorsed.

### Discussion Points

This effort is in keeping with the suitable pressure to ensure that device utilization is appropriate and to ensure that device necessity is evaluated and removed. Certain process measures are good for each hospital to be aware of, but do not make good NQF measures or financial targeting measures for penalty. This metric is one of those measures because the way in which it is calculated makes it susceptible to outliers. For instance, a person who stays in the burn ICU for 300 days will send the results “off the charts.” There are not adequate risk adjusters, and it cannot take co-morbidities and other factors into account. As everything endorsed by the CDC can be taken up for reporting and for downstream fiscal penalty, HICPAC should be thoughtful regarding the elements for which the lack of risk adjustment can be unfair. The current pressure on hospitals to remove catheters is good. The proposed measure may help, but should not be recommended for endorsement for a penalty.

Another potential problem is that the SUR treats Day 14 the same as Day 1 in each unit. As length of stay changes or is variable unit-to-unit, the opportunity for removal varies. If it is applied as presented, the metric may result in substantially higher SURs in ICUs with short lengths of stay and high throughput than in those with patients who have longer stays. It may be possible to standardize to a reference length of stay distribution.

The number of beds on the unit level can be unpredictable. Some hospitals use licensed beds, but the number of licensed beds and operational beds can differ by as much as 50%. NHSN may not be clear on this point. Further, when the location has been mapped in NHSN, it never changes. If the model is based on the number of beds in NHSN, the results may not be valid.

The metric found an association between device utilization and CAUTI rate.

**Update on CAUTI Surveillance Definitions**  
**Carolyn Gould, MD, MSCR**  
**DHQP, NCEZID**  
**Centers for Disease Control and Prevention**

The major concerns that were addressed during the revision of the CAUTI definitions came from NHSN users and other experts:

- ☐ Clinical credibility:
  - One study showed that the positive predictive value (PPV) of the CAUTI surveillance definitions was only 35% compared to an infectious disease (ID) consultant diagnosis.
  - The inclusion of yeast and attribution of fever were the most significant concerns.
  - The presence of lower microbial counts as part of the definition was another concern.
- ☐ Application to special populations.
- ☐ Laboratory variability in diagnostic practices.
- ☐ Reporting requirements and their implications.

In January 2012, CAUTI reporting was mandated by CMS for acute care hospital adult and pediatric ICUs. In October 2012, reporting was mandated for long-term acute care hospitals and inpatient rehabilitation facilities. In January 2013, Prospective Payment System (PPS)-exempt cancer hospitals began reporting CAUTI. In January 2015, acute care hospital adult and pediatric medical, surgical, and medical/surgical wards will report CAUTI.

The working group considered qualities of an ideal surveillance definition, which should be:

- ☐ Credible
- ☐ As sensitive and specific as possible, generally favoring specificity over sensitivity if there is a trade-off
- ☐ Objective, which will minimize the need for interpretation or decision-making for the data collector
- ☐ Easy to capture and ideally amenable to electronic reporting
- ☐ Minimal burden
- ☐ Appropriate for current laboratory protocols so that the criteria will be applicable in most cases

The CAUTI definitional review began in February 2013, when an internal core working group was convened and engaged external experts. The group conducted targeted literature reviews during the discussion process and analyzed NHSN data when necessary. HICPAC feedback was gathered at the June 2013 meeting. A survey of clinical laboratories was developed and performed in collaboration with Association of Professionals of Infection Control and Epidemiology (APIC). It focused on assessing protocols for urine culture workup, criteria for pathogen identification, and methodologies used for urinalyses. Overall, 340 surveys were completed, and the results are being assessed.

The working group addressed many questions, which included the following:

- ☐ Should inclusion of yeasts as urinary pathogens continue?
- ☐ Should the quantitative culture categories be modified?
- ☐ Should the clinical criteria be modified for certain special populations?
- ☐ Should a UTI be reported on the basis of fever, even if another cause of fever is identified, which is the current paradigm?
- ☐ Should the use of urinalysis continue to be included in the UTI definitions?

The inclusion of yeasts as urinary pathogens is problematic because yeast is a rare cause of UTI, but a frequent cause of colonization in some populations. Treatment of candiduria is not associated with clinical benefit, and there were concerns that inclusion may encourage inappropriate antifungal prescribing to prevent or treat the CAUTIs. The working group also expressed concern about the lack of clinical credibility leading some facilities to adjudicate and not to report.

Overall, 15% of the CAUTIs reported to NHSN between 2009 and 2013 were due to yeast. If yeast were removed from the definition, there would be a 20% reduction in CAUTIs in ICUs. There would be a nine percent reduction in non-ICU locations. A lower proportion of CAUTIs are not associated with catheters.

CDC conducted a temporal analysis of CAUTI SIRs with and without yeast between 2010 and 2013. There was an increase in SIR when the reporting mandate began. The numbers are divergent in 2013, but it is not clear why. The laboratory survey results indicate that there is variability among whether laboratories quantitate yeast when it is isolated. If it is not quantitated, then it might not meet the criteria in NHSN. Approximately 50% of respondents always quantitate yeast; 24% quantitate when it is the sole pathogen; 12% conduct a semi-quantitative report, and 11% do not quantify at all.

The current quantitative culture categories are less than or equal to 100,000 CFU/ml for Symptomatic Urinary Tract Infection (SUTI) 1 and between 1000 and 100,000 CFU/ml, with a positive urinalysis, for SUTI 2. The working group identified problems with these criteria, including laboratory variation in quantitative reporting. Further, there were concerns that lower colony counts are less likely to represent true infection. However, some data contradict this idea and show that low-level bacteriuria progresses to more than 100,000 CFU/ml very quickly. The percentages of SUTI 1 and SUTI 2 reported have secondary bacteremia in NHSN are similar, which does not suggest a significant clinical difference.

The laboratory survey also assessed the quantitative threshold that laboratories use to determine whether the organisms are definitively identified in a urine specimen from an indwelling urinary catheter. The thresholds varied: 14% of respondents used a threshold of 1000 CFU/ml, 49% used a threshold of 10,000 CFU/ml, 12% used a threshold of 50,000 CFU/ml, and

14% used a threshold of 100,000 CFU/ml. The sample of laboratories in the survey is small and may not be representative, but the variation is interesting as it pertains to the ability to report.

The working group considered removing the lower colony count definition altogether and the potential impact that this change might have on reporting. The change could lead to a 10% reduction in CAUTIs and a 7% reduction in non-CAUTIs. The quantitative culture categories could be modified based on the most common laboratory protocols, but the protocols are quite variable. If the categories were modified and simplified to include only one category with a lower threshold, problems may arise, as 26% of the laboratories surveyed did not work up pathogens with less than 50,000 CFU/ml and may result in uneven reporting.

The working group discussed special clinical populations in which CAUTIs may be over- or under-reported (e.g., elderly, ventilated, depressed level of consciousness, spinal cord injury, and immunosuppressed).

CDC has heard concerns among rehabilitation and spinal cord injury (SCI) professionals regarding hospitals that erroneously remove indwelling catheters from SCI patients when they are admitted to reduce CAUTI rates. In many cases, the hospitals are mistaking overflow incontinence for “volitional voiding.” There are anecdotal cases of resulting renal dysfunction. This removal is contrary to CDC guidelines. The rehabilitation and SCI professionals strongly advocate for the complete removal of SCI patients from CAUTI surveillance. The working group will continue to discuss this issue, but problems associated with removing these patients from surveillance include defining the populations and excluding their denominator days. Also, other populations have chronic urinary retention; there will likely be implications if the SCI population is removed from the CAUTI definition.

CDC has begun to collect risk adjustment variables that could be used in SIRs to address issues with special populations, particularly in inpatient rehabilitation facilities. An annual survey was created for those facilities, but not for acute care hospitals, within NHSN that collects types of patient populations, specifically the proportion of admissions with different conditions. Another potential approach is to add objective signs or symptoms to the survey, such as selected McGeer definitions: acute pain, swelling, or tenderness of the testes, epididymis, or prostate; and purulent discharge from around the catheter. Other signs and symptoms in the McGeer definitions are less objective.

One of the most significant issues was whether a UTI should be reported on the basis of fever. To ensure objectivity, NHSN does not currently allow decisions on fever attribution. Some units with higher prevalence of fever for other reasons, such as neuro-ICUs, express concern that they will be penalized for high CAUTI rates when most of their patients do not have UTIs. Reporting on the basis of fever also causes problems related to clinical credibility. Because specific UTI signs and symptoms are uncommon and poorly documented in hospitalized patients with catheters, the diagnosis is usually made on the basis of fever or other non-specific signs or symptoms. CAUTIs defined on the basis of fever alone represent approximately 86% of the CAUTIs reported in NHSN. The percentage is approximately 34% for non-CAUTIs.

Discussion is ongoing regarding developing specific criteria to define when a CAUTI should not be reported on the basis of fever. Initially, the most promising option was to exclude UTI if another NHSN-defined source of fever is identified. A concern with this approach is that rules and hierarchy will need to be established.

Another concern with the UTI definitions pertains to whether urinalysis should continue to be included in them. Urinalysis is not specific. Up to 70% of catheterized patients with bacteriuria

have accompanying pyuria. Further, there is variability in laboratory reporting methods of pyuria, and there are no standardized criteria for a “positive” urinalysis. The 2009 IDSA guideline indicates the lack of utility of pyuria for differentiating bacteriuria from CAUTI. The guideline does state that the absence of pyuria suggests another diagnosis, assuming that the patient is not neutropenic. Pyuria is used to make clinical decisions, so there is value in it if it is negative, but it is not useful if it is positive, especially at a low level. A better laboratory test is needed to indicate infection.

The laboratory survey asked about laboratory tests that determine the work-up of urine cultures. Over 50% of the laboratories use the urinalysis white blood cell (WBC) count, dipstick leukocyte esterase, or nitrite in some manner.

The working group is considering whether the laboratory can play a role in improving the pre-test probability of the urine culture. Urine culturing practices can lead to the over-diagnosis of CAUTI. In one US Department of Veterans Affairs (VA) hospital, 31% of urine cultures were ordered without an appropriate indication. Of the appropriate cultures, only 13% were ordered for urinary-specific symptoms. These practices not only lead to over-reporting, but also to unnecessary antibiotic use.

CDC conducted an investigation in a hospital with a high rate of CAUTIs, particularly in the ICUs. The investigation concluded that urine cultures were frequently ordered without a clear indication. Chart reviews were conducted on 50 NHSN-defined CAUTIs, which found that 18 (36%) were attributed to *Candida* species, and most were not treated; 8 (17%) were from patients with a urine output of less than 30 cc per hour; 7 (14%) had documented suspicion of CAUTI in the medical record; and 21 (42%) were treated for UTI with antimicrobials.

The hospital had recognized the excessive urine cultures and implemented a urine reflex laboratory protocol. When a urine culture is ordered, the laboratory first automatically reflexes to a urinalysis. This step can be overridden by a physician. The hospital defined “positive” as greater than ten WBC/mm<sup>3</sup>. An interrupted time series analysis was conducted on urine culture rates and CAUTI rates. There was a significant decrease of 67% in urine culturing rates after the policy was implemented. There was a concomitant decrease in CAUTI rates of 63%. No adverse events were noted from not performing urine cultures, but additional studies are needed.

Many of the potential modifications to the definitions are interrelated. If yeast is removed from the equation, then the fever issue may be less prominent. There is a potentially similar strategy to separating mucosal barrier injury bloodstream infections (BSIs) from CLABSIs. The exclusion of CAUTIs in the absence of pyuria at any colony count might improve specificity, although it is not clear how much. There are consequences associated with removing yeast from the equation, as approximately 15% of the secondary BSIs reported to NHSN are from yeast only. If they are not called CAUTIs, then they can no longer be called secondary BSIs and may be reclassified as CLABSIs. That reclassification may be more accurate, but hospitals may not welcome it.

The threshold of less than or equal to 2 organisms and less than or equal to 10 CFU/ml for the positive urine culture may remain or may be lowered. UTIs attributed solely to yeast could be excluded for the purposes of reporting to CMS. There are no plans to remove reporting for yeast because the implications of this change are not known; however, yeast could be removed from reportable CAUTIs and could be excluded in the future. Some may argue that the presence of funguria could be a quality indicator or an outcome that should be followed.

This change represents a simplification of the definition, which moves toward an electronic definition. The modified surveillance definition proposal is being reviewed internally at CDC. More work is needed to understand current laboratory practices for urine culturing and urinalyses. It will be important to work with partners and experts on how to standardize those laboratory practices to improve consistency of reporting across facilities. There is also the potential to follow fungurias as a potential quality indicator.

### Discussion Points

HICPAC's perspectives were requested regarding removing yeast from any reporting, even for internal quality improvement. The problems with yeast reporting and penalization are clear, but it is not clear whether yeast should be completely excluded from reporting to CDC and what the unintended consequences might be.

HICPAC supported removing yeast. Marginal benefits are associated with collecting yeast, and time is better spent preventing *C. difficile* and CLABSI than on reporting yeast. At some point, reporting may not just be CMS reporting. There is a need to align the numbers that are reported and what facilities are accountable for. There are different risk models and different numbers in SIRs for SSIs. There is frustration at the front line, where personnel will wonder why yeast would be removed from CMS reporting, but the institution will still be held accountable for it. Staff try to be accountable and focus on things that are preventable. There may be something to be learned from yeast, but the "downside" may not be worth it, and they should simplify the process.

There is enormous pressure on hospitals not to report yeast, and a number of hospitals are not reporting deliberately. The unintended consequences are already known, and the consequences of removing it are less than the adjudication and lack of reporting that are already occurring. Further, when a large proportion of hospitals treat colony count grossly differently, there will be implications to force laboratories to restrict colony counts to avoid the stated definition. HICPAC should not only address yeast, but also the colony counts, given the diversity in laboratories and how they are reporting. This revision should be implemented as soon as possible, because penalties are ongoing. The pressures on hospitals are very strong, and they are morphing the definitions to avoid penalties.

Regarding removing some fungal infections, 15% of them will be reclassified as CLABSI, which is probably how they should have been classified all along.

HICPAC thanked CDC for their hard work and noted that using urinalysis as a negative marker is a strong aspect of the proposed definition change.

HICPAC suggested that CDC work with the College of American Pathologists (CAP) or other groups to standardize the definitions of bacteria, especially with respect to funguria, particularly regarding urinalysis to accompany a urine culture. Microbiology laboratories are standardized, and these agencies could help CDC make improvements. *Candida* may not be used as a quality

indicator, but issues with CAUTI suggest issues of quality related to antibiotic stewardship and duration of catheterization. UTIs are a common initial source of a subsequent bacteremia.

The sensitivity and specificity of urinalysis, particularly among surgical patients who have had Foley catheters in place, is abysmal. Much of the surgical population has been actively discouraged from using urinalysis; rather, they depend on CFU and do not treat patients with less than 100,000 CFU/ml. This approach has led to less antibiotic use.

Ideally, the definition of CAUTI could be based on clinician treatment for CAUTI. This approach is not feasible for surveillance, however. The use of surveillance for antimicrobial stewardship is questionable. Prior to 2009, clinician treatment and diagnosis were part of the definition, but those elements were eliminated. It may have been the right decision to eliminate those elements because they are difficult to collect, but there also may have been unintended consequences, and the same may be true with eliminating yeast. The issues of antimicrobial resistance (AMR) and the need for a proper definition of CAUTI can both be addressed, which will likely lead to reductions in *C. difficile* and in over-prescribing of antibiotics. If a treatment-based definition for CAUTI is not possible, then the proposed algorithm is sound.

There was discussion regarding the temporal analysis and changes in the percentage of yeast between 2012 and 2013, and whether that change might be the cause of the lower SIRs, or whether the percentage of yeast per year was consistent. There are two likely causes for the change in 2013. There was a clarification in the definition regarding fever from any source, and penalties were applied by CMS. Both of those elements led to enormous efforts to adjudicate and not to report. Many hospitals do not report yeast or only report a high colony count. The population base has therefore changed. This problem is major for the system and obligates them to be very thoughtful about the definition that they use.

The CAUTI definition will go into place in January 2015 when NHSN is re-baselined. Most clinical laboratories in the survey used a culture threshold of  $10^4$ . It is not clear whether there is a clinical reason for this threshold. If the threshold is lowered below 50,000, approximately 26% of laboratories would not quantitate. They should decide whether to raise the threshold, and how far to raise it. They should not rely on the survey to provide the answer to the question, because the survey is not representative of the nation; however, it is necessary to work with groups to standardize procedures.

There are no standards for how urine cultures are processed, and the processing standards are highly variable. It is not clear who will set those standards. Further, does NHSN want definitions to drive laboratory practice? HICPAC supported the idea of setting the threshold as high as possible, putting all hospitals on a “level playing field” and not favoring hospitals that only quantitate at the highest levels. It is important to understand the difference between a clinical, bedside definition and what guides treatment as they track the outcome measure fairly. Regarding surveillance, time and money might be better spent not tracking outcome measures related to UTIs, but were invested in hand hygiene and improving catheter utilization. It is also important not to leave an opportunity for hospitals to lower their rates artificially simply by changing their culture practices.

There may be problems associated with using urinalysis in the algorithm. It is not clear what will be done when urinalysis is not performed, and it is also not clear whether the expected negative predictive value will provide significant added value to the definition. The sensitivity and specificity of any cut point for WBC in many patient populations is poor.

The antibody-coated bacteria test is used to differentiate upper tract from a prostate or bladder source. It could be used to determine whether a systemic UTI is present and to localize the source of bacteriuria.

## **Public Comment**

Dr. Fishman called for public comments at 5:01 pm. Hearing none, he proceeded with the agenda.

## **Liaison Reports**

The full written reports submitted by HICPAC liaison representatives and *ex officio* members are included in this document as Attachment #2.

National Institutes of Health (NIH): NIH is continuing its assessment of the healthcare-associated epidemiology of vancomycin-resistant *Enterococcus faecium* (VRE) and colonization in the hospital. There are also ongoing efforts to manage CREs. Dr. Henderson reported that after 35 years serving as the hospital epidemiologist at the NIH Clinical Center, he has “passed the torch” to Tara Poundmore. He will remain connected to the program.

Agency for Healthcare Research and Quality (AHRQ): On June 5, 2014, the Secretary’s Award for Meritorious Service was awarded to CDC’s Dr. Denise Cardo.

Health Resources and Services Administration (HRSA): No report.

FDA: No report.

VA: The VA’s MRSA program is moving forward to decrease HAIs. The effort has been successful and sustained. They are maximizing their antibiotic stewardship and a directive has been signed to ensure that there are programs in all VA hospitals. They will soon receive the first outcome data. The catheter-related bloodstream infection (CBI) initiative is underway, and the VA is beginning a CRE program. The CAUTI program is underway and has begun to show results. The healthcare-associated Legionella program is ongoing.

CMS: No report.

APIC: APIC’s national meeting was held in Anaheim, California, in June 2014, and the attendance was strong. APIC released its textbook for infection control and epidemiology was released in June 2014. Feedback has been positive. International Infection Prevention Week will be October 19 – 25, 2014.

SHEA: SHEA’s spring meeting was successful, and planning is underway for next year’s meeting. A joint meeting will be held in the fall with IDSA. SHEA published the Cystic Fibrosis Infection Control Guideline online, and expert guidance papers are being prepared regarding isolation precautions for visitors and for animals in healthcare facilities. SHEA has also weighed in on a number of policy statements, and the SHEA research network has been busy.

Society of Hospital Medicine (SHM): SHM continues to work with AHRQ, CDC, APIC, and SHEA on the On The CUSP: Stop CAUTI project. Thus far, 950 hospitals and over 1500 units are enrolled. SHM’s data parallels the data presented at this HICPAC meeting: there has been an approximate 30% reduction in CAUTI on the wards and minimal reduction in ICUs. SHM has



asked the Society of Critical Care Medicine (SCCM) for a formal consult to address this problem. SHM is considering an ICU-only cohort to “move the needle” in the ICU.

Surgical Infection Society (SIS): The highlight of the year for SIS is its annual meeting, which was held in May 2014. The theme in surgery appears to be a better understanding of the microbiome and how it affects infectious complications. This viewpoint represents a new way of considering why patients get infections. SIS is involved with the guidelines regarding the diagnosis and management of intraabdominal infections. The process of reviewing and revising that guideline has begun, with anticipated publication in January 2015.

SCCM: With the case of MERS in Indiana, SCCM used its “all hands” communication system to share information. SCCM is working with the European Society for Intensive Care Medicine on revising the consensus definitions for sepsis. Systemic Inflammatory Response Syndrome (SIRS) is likely to no longer be a definitional criterion. SCCM joined the Detect and Protect Against Antibiotic Resistance Initiative. Other collaborations with SHM include work on sepsis outside the ICU and on CAUTI.

Council of State and Territorial Epidemiologists (CSTE): At the CSTE conference in June 2014, every breakout session included a session related to HAIs. Two position statements were passed: state health departments should incorporate stewardship activities across healthcare settings into their HAI programs, and CDC should identify a standardized metric for measuring inpatient antimicrobial use as well as evaluating existing measures for outpatient antibiotic prescribing practices. The other position statement focused on asking state health departments to get access to data for dialysis events for outpatient dialysis units and to request that dialysis events be reportable for dialysis units that are currently not covered under the CMS requirement. A working group is being formed to address drug diversion among healthcare workers, which appears to be a significant problem that occurs at a common pace.

DNV Healthcare: DNV Healthcare Accreditation has accredited over 4000 hospitals. They have launched a verification status for hospitals and are involved in presenting educational workshops to prepare hospitals for infection prevention advancement. They are in the process of awarding certification status to a number of hospitals.

Association of State and Territorial Health Officials (ASTHO): ASTHO continues to collaborate with CDC to collect best practices for state HAI prevention. Four states have conducted capacity-building projects to assess barriers and opportunities surrounding antimicrobial stewardship and accessing electronic health records (EHRs) remotely for HAI outbreak response. ASTHO is collecting additional tools and developing a report of “lessons learned” that will be disseminated in the summer of 2014. ASTHO convened two Round Table sessions at the June 2014 CSTE meeting: one with the Virginia Department of Health regarding *Innovating Public Health Response to HAI Outbreaks by Understanding Barriers and Benefits to EHR Access*; and another with CDC regarding combating antibiotic resistance.

National Association of County and City Health Officials (NACCHO): Demonstration projects under NACCHO’s guidance are in Year Three of four years. Local health departments are working with state health departments to sustain and expand partnerships with local healthcare stakeholders; assess HAI prevention needs within the community; and promote HAI prevention and control messages. NACCHO staff and workgroup members continue to participate in a number of different partner activities. At the NACCHO annual meeting in July 2014, NACCHO collaborated with CDC’s DHQP to conduct a tabletop exercise of an HAI outbreak. NACCHO released several position statements.

AORN: AORN's Standard's and Recommended Practices have been released in an e-book format, which is useful, particularly for surveillance. The standards regarding surgical attire are open for public comment until July 20, 2014. Standards for skin asepsis were approved and will be published in July 2014. The next topics for public comment will be the care and cleaning of surgical instruments and surgical tissue management. AORN has begun a collaboration with TeamSTEPPS to develop materials for perioperative settings and to serve as a regional training center in Denver, Colorado.

The meeting stood adjourned at 5:15 pm.

#### **Friday, July 18, 2014**

The second day of the meeting of the Healthcare Infection Control Practices Advisory Committee was called to order at 9:05 am on Friday, July 18, 2014. A roll call was conducted to establish quorum. HICPAC members declared conflicts of interest.

## Advanced Laboratory Techniques for Prevention and Control of Healthcare-Associated Infections

**Brandi Limbago**

**Deputy Branch Chief, Clinical and Environmental Microbiology Branch**

**DHQP, NCEZIS**

**Centers for Disease Control and Prevention**

Advanced molecular detection (AMD) is an approach that DHQP can use to address top priority areas and answer priority questions:

- ☐ Colonization: how does asymptomatic colonization contribute to the development and expansion of multidrug-resistant organisms (MDROs) in healthcare and potentially outside of healthcare, and asymptomatic colonization be reliably detected with MRDO?
- ☐ Transmission: can AMD inform understanding of how MDRO transmission occurs, i.e. patient-patient, staff-patient, or environment-patient? With AMD, it may be possible to drill down to understand more about directionality of transmission. Further, what is the role of asymptomatically colonized patients in transmission? AMD can help in the development of interventions where current recommendations have gaps.
- ☐ Evolution: why are some MDROs, particularly certain strains of CRE and *C. difficile*, expanding more rapidly than others?

DHQP welcomes HICPAC's input regarding other priority questions. The division is engaged in a number of efforts related to AMD.

- ☐ A number of outbreak investigations have been conducted, particularly regarding CRE. When an organism is indistinguishable by PFGE, whole-genome single nucleotide polymorphism (SNP) analysis is applied. AMD has also been utilized in outbreaks related to ERCP procedures.
- ☐ Projects are ongoing related to *C. difficile* carriage, transmission, and infection. One of the projects is examining isolates in asymptomatic patients who were colonized with *C. difficile* came to acute care facilities. The project is following up to determine which strains are causing infections and whether they can be linked to the asymptomatic carriers.
- ☐ AMD is being utilized to predict CRE transmission in long-term care settings.
- ☐ DHQP has employed whole genome analysis to understand the evolution of Clonal Complex (CC) 8 MRSA. This lineage is highly pathogenic and is common in community settings. It also causes disease in healthcare settings. Before whole-genome analysis, the techniques were limited and could not determine the difference between transmission in a healthcare facility and coincident introduction from the community.
- ☐ The division is considering the role of the environment in outpatient settings for *C. difficile* to understand how the healthcare environment contributes to community-onset disease.
- ☐ Work is ongoing on the KPC-producing *K. pneumoniae* ST258 lineage.
- ☐ Whole-genome analysis is being utilized to analyze CRE with unknown resistance mechanisms.

The project on the evolution of ST258 *K. pneumoniae* addresses overarching questions regarding evolution and transmission. This study collected a large number of ST258 *K. pneumoniae* and related strains. It is the dominant KPC producer in the US and worldwide, but ST258 does not have to be a KPC producer. ST258 is part of a larger group, CC11, of related

isolates that includes KPC producers and non-KPC producers from different countries. The collection of isolates spanned 17 years.

All of the isolates were analyzed by whole-genome sequencing (WGS) using Illumina paired-end reads assembled against two *K. pneumoniae* reference genomes. They were aligned against each other and analyzed for SNPs. A Bayesian Evolutionary Analysis Sampling Trees (BEAST) analysis looks at all of the changes to find a tie to the most recent common ancestor. After the analysis, it was concluded that this group is highly clonal, which is not surprising. Divergence was observed in the capsule polysaccharide locus and in some of the outer membrane profiles. Other strains of closely-related ST-type organisms show more diversity and some clonal groupings, largely by geography.

The BEAST analysis found the most recent common ancestor approximately 19 years ago, when ST258 expanded. KPC emerged at about the same time. It appears that something about this strain and that particular resistance mechanism caused them to appear at the same time and expand together, but it is not clear how they are related, or which is the “chicken” and which is the “egg.”

DHQP is embarking on another study on *C. difficile* transmission in acute care. It is a 15-month quality improvement project that was initiated by an independent outside investigator that will study the role of asymptomatically-colonized patients in *C. difficile* infection in acute care settings. The initiative includes culture-based surveillance for admission, transfer, and discharge. It also includes point prevalence surveys and documenting whether patients have symptoms at the time of culture. Interventions will be initiated based on detection of *C. difficile*, and CDC will conduct strain typing on all recovered isolates. The “first pass” will be PCR-ribotyping. Isolates that are indistinguishable or closely related will undergo whole genome analysis.

The division recently conducted an investigation of *Mycobacterium wolinskyi* in SSIs, addressing the overarching questions of transmission, evolution, and colonization. This outbreak was a cluster of SSIs with this organism, which is relatively uncommon. A single facility experienced numerous infections related to orthopedic procedures with different surgeons and clinics. Environmental cultures were negative for *Mycobacterium wolinskyi*, but the epidemiological investigation found that a single healthcare worker was common among all of the case patients. This worker had a hot tub, but denied using it. The hot tub water was cultured and *Mycobacterium wolinskyi* was recovered.

CDC conducted PFGE analysis on the cultures, using two different enzymes to achieve finer resolution. Two isolates from CDC’s freezer collection were also analyzed to serve as comparators. The patient isolates are clustered and are closely related to the isolates from the hot tub. The archived isolates are distant. Whole genome SNP analysis was applied, and it revealed that all of the isolates are closely related, indicating a clear link between the hot tub and the patient infections.

**Priorities for Bridling the Human Microbiome to Control MDROs**  
**Dr. Cliff McDonald**  
**DHQP, NCEZID**  
**Centers for Disease Control and Prevention**

NIH has devoted \$150 million to consider the microbiome. Similar investments are being made in Europe, and there is excitement about the issue. "We are as much organism as we are human cell," and the Human Microbiome Project has several focus areas. The intestinal microbiome is important for colonization and transmission of MDROs. Microbiota are microorganisms living in or on us, while the microbiome is the collective genome of the microorganisms.

The genomics approach to this work has revolutionized the field. It has long been known that many organisms live in and on humans, but it was not possible to culture them. It is still not possible to culture most of them, but the genomics approaches improve understanding of them.

The most organisms in the human body live in the intestines. There are different levels of organism load throughout the GI tract. Our intestinal microbiota are not dominated by gram negative bacteria. *E. coli* is a minor bacteria only composing about three percent of the lower intestinal biota, and some people do not have *E. coli* in their lower intestinal microbiota. Gram negative bacteria do dominate in the upper intestine and the duodenum, so it is perhaps not by chance that the duodenoscopes become contaminated, as described in a previous presentation.

The intestinal microbiota includes approximately  $10^{14}$  organisms per gram. Over one million genes are in the human microbiome, where the human genome has comparatively few 23,000 genes. The genes in the microbiome are producing proteins that have enzymatic and metabolic function. It is not hyperbole to think of the microbiome as another organ in the human body.

Most people associate the microbiome with obesity, asthma, or chronic diseases. The microbiome represents a tremendous opportunity in infection control. The key premise is that the intact human microbiome is a primary host defense for preventing colonization, dominance, and infection with pathobionts. "Dominance" refers to when a certain organism begins to dominate other members of the microbiome. "Pathobionts" is a new term that takes into account that only a small subset of commensals or the microbiome will act as a pathogen. These pathobionts only act as a pathogen when there is a disruption in the microbiome that allows them to act as a pathogen. Many organisms such as *C. difficile* and other MDROs are really pathobionts.

The importance of the microbiome as a host defense is mediated by a variety of factors, not all of which are understood, including competition for food sources; antibacterial substances; triggering host antibacterial substances or immunity; or specific signaling. For example, an important signal for germination of *C. difficile* spores to begin growing in the colon is certain biosalts. Bacteria in the colon are key for conjugating those biosalts. In the secondary form, they do not signal germination. When the bacteria that are normally in the colon are not present, the biosalts in the primary form are present in a high level and signal the spores to germinate and begin growing. *C. difficile* has developed this evolutionary function.

CDC is working toward the large goal of developing Microbiome Disruption Indices (MDIs). These indices could be used to stage patient need for microbiome restoration; monitor patients before, during, and after antibiotic therapy; and intervene when disruption reaches critical levels or if colonization or dominance is detected. Further, the indices can characterize the risk of specific antibiotics. The field has considered antibiotic pressure to be selective; for example, in the case of *K. pneumoniae* developing CREs. Most of the time, however, antibiotic pressure is on the microbiome. When antibiotics are applied to a human, they are applied to an entire microbiome community. Pressure on that community allows overgrowth and selection of the resistant phenotype. MDIs could be utilized to create a rating system to gauge the relative risks of different agents. They could be determined during the approval process and included in the package insert.

When a normal microbiome that is resistant to colonization becomes disrupted by antibiotics, it becomes susceptible to colonization. MDROs come into contact with that patient, frequently via the hands of healthcare workers, and colonization ensues. Further antibiotic disruption often occurs as the patients return to the healthcare system, which leads to cross-transmission. CDC seeks to establish the “normal” MDI seen with a microbial, the MDI that is permissive for colonization, the MDI that promotes dominance, and the cumulative MDI in a hospital that leads to transmission and antibiotic resistance problems. Antibiotic stewardship can be refocused on reducing transmission via reduced cumulative MDI. The future will bring advanced probiotics that can be administered either with an antibiotic or soon thereafter, which may have a profound effect on MDRO transmission.

CDC’s efforts to understand the degree and duration of microbiome disruption begin with a cross-sectional pilot study with Emory University in long-term acute care hospital inpatients. Waste specimens are used from patients who were screened for *C. difficile* infection. The pilot applies 16S ribosomal RNA encoding DNA amplification to create a compositional “snapshot” of the predominant bacteria components in the lower intestinal microbiome. That data are considered in association with antibiotic exposure histories and colonization with MDROs. The Emory study includes two young, healthy fecal donors with no antibiotics. The other patients vary in age and the antibiotics they received in the 48 hours before stool collection.

The Washington University Prevention Epicenter is conducting a study in 10 healthy volunteers. Stool is collected at baseline, and then moxycillin/clavulanate is administered. 16S profiling is performed before, after, and during resolution of the microbiome. This work will provide insights into the MDI of the antibiotic. This study may need to be repeated multiple times for other antibiotics.

The normal lower intestinal microbiota of healthy humans without antibiotics reflects the dominance of Bacteroidetes, which do not cause disease and are infrequently referenced in the clinical arena. Bacteroidetes is a sign of health: “the more, the better.” Another component of a healthy microbiome is the phylum Firmicutes, which includes “good” as well as “bad” gram-positive organisms such as *Staphylococcus*, *Clostridia*, and VRE. Gram-negative organisms are the phylum Proteobacteriae. A potential MDI metric could be loss of Bacteroidetes and expansion of Proteobacteriae, which is a significant problem in healthcare. The patients in the Emory study are clearly dominated by different organisms, including Firmicutes that are not pathogenic and VRE. Another potential MDI Metric is the loss of diversity as measured by the Shannon Diversity Index.

A “happy” gut microbiome is diverse and dominated by Bacteroidetes and Firmicutes, with few Proteobacteriae. The gut microbiome of one of the patients in the Emory study, who has received a great deal of antibiotics and become dominated by VRE, has less diversity.

It is important to understand not only the point prevalence, but also the natural history of microbiome disruption that precedes colonization and dominance of MDRO. The Chicago Prevention Epicenter is conducting microbiome studies prior to and following CRE colonization. CDC will conduct a follow-up pilot study with their Emory collaborators, utilizing different techniques for analysis and for understanding the microbiome.

Another next step is to provide proof of concept that microbiome restoration can ameliorate MDRO dominance of colonization and improve the resistome, which incorporates all of the resistance genes in the microbiome. At Washington University, researchers will collect stool from volunteers and give it back to them after the antibiotic administration to conceptually show how the volunteers’ own feces will help return them to baseline more quickly. CDC has been in discussions with companies to develop advanced probiotics that may ameliorate MDRO dominance or colonization.

### **Controlling Healthcare-Associated Spread of MDROs – the Contribution of Whole Genome Sequencing**

**David K. Henderson, MD**  
**National Institutes of Health**

The problem of MDROs becomes more complicated every day as different organisms emerge. One of the most significant challenges is accountability. No ironclad dataset is available to show how patients are infected, whether by the hands of healthcare workers, contaminated equipment, other fomites, or the environment. It is important to understand which routes of transmission occur most commonly and where prevention efforts should be targeted.

MDROs have become an enormous problem for hospitals that treat seriously immunosuppressed patients. These patients are at risk because their microbiomes are destroyed and they have no host defense. Historically, hospitals have not been the safest places. In the 19<sup>th</sup> Century, hospitals were places people went to die; in the 20<sup>th</sup> Century, hospitals were places people went for diagnosis and treatment; perhaps in the 21<sup>st</sup> Century, hospitals will become places where individuals can go for investigation and prevention of disease. If pan-antimicrobial resistance is the problem, then the solution is prevention in a variety of venues.

WGS of MDROs is valuable to healthcare epidemiology. Genome sequencing has been effective in tracking world-wide dissemination of infectious diseases, such as the cholera outbreak in Haiti. WGS allowed for the collection of isolates from all over the world. The isolates were sequenced, and it was determined that the Haiti outbreak was the result of an outbreak in Asia. Coupled with traditional “shoe leather” epidemiology, WGS can paint a complete picture of an outbreak.

Work at the NIH and with the National Human Genome Research Institute (NHGRI) has demonstrated that differences in organisms’ genomes can be used to recreate their history by tracking mutations and changes. The same concept can track the spread of infectious disease, such as the spread of KPC in a hospital. A patient known to be infected with a drug-resistant form of *K. pneumoniae* was admitted to the NIH Clinical Center in June 2011. An infection preventionist discovered the organism on the patient’s chart, and the patient was immediately

placed in enhanced isolation. The patient was in the ICU for 24 hours during one visit, and 32 hours during the second visit. Save one, all of the transmissions occurred during those times.

Regular surveillance cultures were conducted on patients in the ICU for two weeks after the infected patient was there. Surveillance cultures were also conducted on patients in the ward. The patient was discharged, and no isolates were detected in the hospital for one and one-half months. In mid-August 2011, a similar isolate was discovered in another patient. Initially, it was not clear whether the second isolate was the same strain. It represented the first CRE isolate that was ever found at the clinical center, which made the assessment easier. Knowing the index cases also made the assessment easier.

Ultimately, 18 patients acquired the strain. Some were identified via clinical cultures and some through surveillance cultured. The median age of the patients was 44, and almost all of them had a severe immunodeficiency, either as a result of a stem cell transplant or chemotherapy for a malignancy. Nine of them were only colonized with CRE, and nine developed bloodstream infection. Of those patients, seven died of CRE. Four patients died of underlying conditions.

After this terrible event, the facility wanted to determine how the outbreak unfolded. The isolates are so clonal, they cannot be distinguished via PFGE or repetitive element palindromic polymerase chain reaction (RepPCR). The hospital then conducted a bed trace to try to reconstruct the transmission, but patient overlap did not provide a clear picture of how the outbreak unfolded.

A major question in the investigation concerned whether *Klebsiella* evolves fast enough over time to track the spread over weeks. The index case had been colonized for some time. Four distinct isolates were recovered from her: urinary tract, bronchoalveolar lavage (BAL), groin, and throat. These isolates were arrayed using an algorithm to generate a transmission map.

The map showed that the facility's "Patient 2" was not the second patient; Patient 3 actually transmitted to Patient 2. This finding is confirmed by the epidemiological investigation as well, and it emphasizes the inadequacy of the detection system to find these organisms in the stool. Several surveillance cultures were performed on Patients 2 and 3, and all of the cultures were negative. Patient 18 was discovered in July of 2012, some time after the initial outbreak. Patient 13 had been rehospitalized, and Patient 18 acquired the infection at the time, despite strong infection control precautions. The identical isolate was recovered from the handrail outside the patient's room. This finding represents the only environmental connection associated with this outbreak.

Several lessons were learned from the outbreak. The outbreak was clearly clonal, originating from patient 1. *Klebsiella* outbreaks such as these, with resistant organisms, can spread undetected from individuals who are silently colonized and cannot be reliably detected using rectal swabs or stool cultures. Rectal surveillance is critical for the detection of silently-colonized patients and for stemming transmissions, but it is not sensitive enough. Genetic sequencing offers promise as a more sensitive fingerprinting technique and may provide a mechanism to investigate specific instances of transmission in healthcare institutions.

Since the last outbreak, 14 additional isolates of CRE have been detected in the clinical center. All of the isolates have been sequenced, and none is related to the index case or to the epidemic strain. Some of the isolates are non-KPC CREs, and some are non-*Klebsiella* organisms.



There are barriers associated with this technology. The cost of WGS is decreasing as the technology advances, but it is still a barrier. Bacterial sequencing is cheaper than human and costs between \$50 and \$100 per bacterial genome. There is substantial within-patient genetic diversity, which may be a substantial issue for people who are chronically colonized. The rate at which genomic evolution occurs may vary by organism and may be influenced by other environmental factors in the host. Access to this technology is a barrier. Turnaround time is important so that data are returned fast enough for action to be taken.

Next steps include employing WGS to evaluate plasmids that are carrying the KPC gene and copies of it. An ongoing study is evaluating the plasmids' biology, ecology, and epidemiology. WGS is being used to evaluate VRE isolates in the clinical center, especially in the stem cell transplant service. Ultimately, it will be ideal to utilize WGS in real time, especially in clusters, first to establish or disprove clonality and then to assess individual transmission events to ascertain definitively routes of transmission and to tailor prevention efforts.

### Discussion Points

Bioinformatics represents a barrier to access for facilities and regional and state laboratories, since these tools generate a large volume of data and there are costs and time required. CDC is working to improve procedures and workflow so that processes are standardized. When CDC establishes standard operating procedures, they can work with state health and hospital laboratories. CDC will publish its pipelines for its investigations as they are defined and improved over time. Bioinformatics is also challenging because new software and technologies emerge frequently, and it is difficult to understand the incremental benefit of new approaches. NIH is also interested in the issue of bioinformatics.

There was interest in applying these ideas to the NICU population. Literature shows that for most organisms, colonization precedes infection. Dominance is also an intervening theory. Studies in the neonatal population show that most late-onset sepsis is preceded by colonization and a period of dominance, usually in the intestinal microbiota. These factors could be monitored in the future.

WGS is especially exciting to determine transmission routes for clonal organisms. The science is complex and evolving. Developing standards and best practices will be important, as well as improving understanding of issues such as the within-patient diversity of the organisms and their "evolutionary clock." Focusing on these issues, as well as on educating healthcare epidemiologists regarding understanding and interpreting these tests and results, will be important.

### **Improving Antibiotic Use Among Hospitalized Patients**

**Dr. Arjun Srinivasan**

**DHQP, NCEZID**

**Centers for Disease Control and Prevention**

A *Vital Signs* on antibiotic prescribing topic was published in March 2014. The feature emphasized several issues, including the following:

- ❑ There is a great deal of variation in the amount of antibiotics being prescribed in hospitals. NHSN data demonstrate a three-fold difference in just medical/surgical wards.
- ❑ Modeling work conducted at the Utah VA demonstrated that reducing the prescription of high-risk antibiotics that most often lead to *C. difficile* infection by 30%, then *C. difficile* infections could be reduced by 26%.

- ❑ Information was presented from the Antibiotic Appropriateness Assessment, a pilot assessment in 26 hospitals. It applied tools to patient records obtained during the HAI Point Prevalence Survey to examine prescriptions for UTIs and for vancomycin. This assessment utilized relatively objective criteria and generally-accepted practices for appropriate use of antibiotics and showed room for improvement in prescriptions for UTIs and in vancomycin.

The Core Elements of Hospital Antibiotic Stewardship Programs, which incorporates feedback from HICPAC and others, is guidance for hospitals on implementing antibiotic stewardship programs. The document was released in early 2014. It provides best practices based on the literature and expert opinion that are associated with successful antibiotic stewardship programs, including the following:

- ❑ Leadership commitment from the facility
- ❑ Accountability, including naming a program leader and a pharmacy leader
- ❑ Drug expertise
- ❑ Specific interventions to improve use
- ❑ Tracking of antibiotic use and resistance
- ❑ Reporting the information to clinicians
- ❑ Education on appropriate antibiotic use

CDC is pursuing approaches to measuring antibiotic use. This work is challenging because there is no single source for information about inpatient antibiotic use in the US. The strategies include the following:

- ❑ Broad, ideally national, assessments of aggregate use, perhaps utilizing proprietary data from drug distributors
- ❑ Facility-specific antibiotic administration data, primarily through NHSN
- ❑ Detailed assessments of appropriate antibiotic use via the Emerging Infections Program (EIP)

Regarding national measures of use, CDC continues to analyze MarketScan data from approximately 300 hospitals across the country. This dataset includes detailed information on antibiotic use that can be linked to patient-specific data. Discussions are ongoing with drug distribution companies to acquire national data on antibiotic dispensing or sales to hospitals. This data could show national-, regional-, or state-level data variations. There are gaps between the drugs that are purchased and the drugs that are utilized, but this approach is the best one on the national level.

The Antibiotic Use Option of NHSN is growing, with more than 60 facilities currently enrolled. The system includes a sufficient number of facilities to provide information that can be summarized and reported. CDC is learning from the enrolled facilities how they are using the information internally. A group of five hospitals in Illinois enrolled in the option, the iCHASE collaborative, are determining ways to use the data to drive interventions, improve use, and monitor the effectiveness of the interventions. The next step for the Antibiotic Use Option is benchmarking. The goal is not just for facilities to track their own use, but to provide benchmarks to compare use to other facilities. It is important to provide useful data summaries before benchmarking, and it is important to determine summary measures. It is also important to determine how to stratify and risk-adjust the data. CDC is collaborating with Kaiser Permanente of Southern California, which is enrolled in the option and is embarking on an effort to benchmark its own antibiotic use. Kaiser also collects patient-specific information that is not

collected by NHSN, but this collaboration represents a strong opportunity to build benchmarking and risk stratification.

CDC is also working on measuring appropriate antibiotic use in hospitals. This measurement is very important, as it will provide specific targets for interventions. The initial pilot assessment was useful, and it will be expanded with the EIP to collect more cases and more hospitals, as well as to collect information on different types of infections, such as lower respiratory infections, and to conduct a broader assessment of fluoroquinolone use.

Work is also progressing regarding variations in antibiotic use. The three-fold differences in prescribing that was reported in *Vital Signs* is seen in other systems as well, and it is important to understand why these variations occur. CDC is working with the iCHASE Collaborative, the VA, and Intermountain Healthcare to delve into variations in use to assess variations in appropriateness of use. They will also assess whether high users of antibiotics are more likely to be inappropriate users, or whether appropriate use does not explain the variation, and variation is driven by the number of infectious disease diagnoses, case-mix index, or provider preferences.

The efforts to measure use are informing the development of a quality measure on antibiotic use that CDC hopes to submit to the NQF in 2015. The metric will be based on the measure in the Antibiotic Use Option, which is antibiotic days per 1000 patient days present. This measure will be challenging to propose. Strong benchmarking will allow for a quality metric that will allow facilities to compare themselves to each other and to determine outliers. Further, outliers do not necessarily have inappropriate antibiotic use. The measure will not serve as a statement on the quality of antibiotic use, but will allow facilities to compare themselves to others and suggest areas for further review.

CDC also seeks to measure antibiotic stewardship programs in hospitals. CDC and the American Hospital Association (AHA) recommend that all hospitals implement antibiotic stewardship programs. Questions on these programs will be added to the NHSN annual facility survey, which will provide information from the 4000 acute care hospitals that report to NHSN. The questions will be based on the Core Elements document and address the specific elements, providing a refined picture of the programs.

A number of efforts are underway regarding education and promotion of the better use of antibiotics. CDC is working with the European CDC to harmonize their core elements for stewardship programs. Work is also ongoing with numerous partners to promote broad implementation of stewardship efforts in keeping with the core elements, including the following:

- ❑ AHA joined CDC at the *Vital Signs* press conference and called on hospitals to implement antibiotic stewardship programs. AHA has designated antibiotic stewardship as one of its top five implementations strategies to improve resource utilization in hospitals. AHA brings the audience of hospital administrators, which is not CDC's usual audience for its recommendations. At their national meeting, AHA will host a Round Table discussion on antibiotic stewardship focused on health system leaders.
- ❑ With the Joint Commission, CDC is co-leading the development of a targeted solutions tool for *C. difficile*. Stewardship is a critical intervention in this tool.
- ❑ CDC continues to work with the hospital engagement networks of the Partnership for Patients. A number of the networks are working on *C. difficile* and antibiotic stewardship.
- ❑ Work continues with CMS to support and inform discussions on policy options to improve antibiotic use. The President's Council of Advisors on Science and Technology

(PCAST) recently recommended the development of a Condition of Participation for Antibiotic Stewardship.

A number of recent policies will help improve antibiotic use. Last month, CSTE passed a position statement encouraging state health departments to play an active role in antibiotic stewardship. ASTHO is working on a statement on antibiotic use and resistance. CDC is working with CSTE, ASTHO, and state health departments to support their roles in antibiotic use.

CDC is working with several academic and other partners to promote research efforts regarding antibiotic stewardship. An ongoing, multi-year, multi-center program is assessing post-prescription reviews of antibiotic use on a number of outcomes. CDC recently partnered with the Prevention Epicenters and EIP to submit a letter of intent to the Patient-Centered Outcome Research Institute (PCORI) for a large-scale stewardship intervention to reduce *C. difficile*.

### Discussion Points

The PCAST report was on antimicrobial resistance and ways to address it in general. Regarding stewardship, the report focuses on only on the inpatient setting, but also on the ambulatory setting. A group including SHEA and other partners crafted a document directed to individual stewardship programs regarding competency and skill sets. It will be submitted to *Infection Control and Hospital Epidemiology (ICHE)* and can serve as an additional tool for programs.

CDC and Emory University are exploring a collaboration on secondary use of data. One area of focus is on implementing standard program and designing more robust reporting mechanisms to hone in on patients where stewardship efforts should be focused. Emory includes a variety of facilities with various staffing models, so there is the possibility to design tools to support efforts in diverse practice settings. *C. difficile* can be a measure of success for these programs.

The annual survey could also include long-term acute care hospitals. Regarding differences in antimicrobial use, an EIP site in Tennessee monitors antimicrobial use with a simplified, ongoing point prevalence survey. The very small hospitals tend to have a large proportion of patients on antibiotics, and many more on intravenous (IV) therapy than oral, compared to other hospitals. It is important to understand whether this difference is due to a lack of understanding of appropriate antibiotic use, or whether it is driven by patient mix or other factors. Intermountain Healthcare includes a number of small facilities and critical access hospitals who are already enrolled in the Antibiotic Use Option of NHSN. The iCHASE hospitals incorporate a range of facilities and bed sizes as well. Little stewardship literature is available from smaller settings.

Many standard approaches to treating infection are based not on good data, but on custom. More comparative studies should be conducted, including clinical trials, to assess how long patients need to be treated, and how the treatment should be delivered. Many clinicians are constrained by dogma, and it is difficult to change without new studies. The Antibacterial Resistance Leadership Group (ARLG) is an important potential partner. It would be helpful for them to hear about the priority of studies on shorter treatment durations. Much of the NIH funding for this work will go through the ARLG, which will develop and promote an agenda on resistance.

There was discussion regarding who might serve as the steward in a large community hospital. The literature indicates that physicians tend to be the most successful as single leaders of the program, but a pharmacy leader must be in place as well. Increasingly, non-ID clinicians, such as hospitalists, are playing leadership roles in stewardship programs. CDC advocates for

flexibility in the leadership, especially since many hospitals do not have an IS clinician. There are also contract-based models for leaders of stewardship programs.

Some hospitals may have more than one ID group, potentially leading to competition. The literature indicates that when a stewardship program is in place, there is more business for the ID consultation service. In many instances, the recommendation of a stewardship program is a consultation. Stewardship programs will not be successful if they are constructed as an oppositional relationship, with a hospitalist-led stewardship program versus the ID consultant private practitioners who work in the hospital. There are opportunities for more involvement of ID-trained clinicians and more partnership between the stewardship programs and other practitioners in the hospitals. Some private practice ID doctors have been concerned about becoming engaged with stewardship programs because of their dependency on referrals. As with most safety initiatives, communication and collaboration are critical. Professional groups are important to addressing areas of tension and concern. Infighting among these different groups will never lead to practice improvement. Clinicians are working on antibiotic use initiatives because they care about their patients. Focusing on patient benefit will encourage other groups to join the efforts.

HICPAC suggested reaching out to nurse practitioners, who are interested in quality and stewardship.

Hospitalists dominate inpatient care at many different facilities. This group is critical, as they drive a great deal of antibiotic choice. CDC has been working with SHM on stewardship for some time.

There is tension between bringing national visibility to antibiotic use in a timely way and waiting for a perfect risk-adjusted measure. The proposed measure does not incorporate an understanding of the quality of outliers. There may be unintended consequences associated with NQF endorsement. The measure is envisioned as a quality improvement measure, not a regulatory measure. It will help facilities evaluate their use and to explore why they are an outlier, if they are an outlier; however, many measures are intended that way, such as ventilator-associated events, but are then incorporated into payment system rules, which is a concern. As a measure for improvement and understanding variability, antibiotic use is extremely important; however, there are risks associated with losing trust and partnership. It is important to communicate with regulatory agencies and help them understand that their measures are good and not good for. CDC can work with CMS and other partners to move in the direction of an ideal measure. They will work with professional groups so that everyone understands the process and the initial measure.

**Infection Control Recommendations for Measles**  
**Amy Parker Fiebelkorn, MSN, MPH**  
**Epidemiologist, Division of Viral Diseases**

Ms. Fiebelkorn provided HICPAC with an overview of concerns related to measles infection control. Measles is an acute febrile rash illness transmitted by direct contact with infectious droplets or by airborne spread. It can result in complications including diarrhea, otitis media, and pneumonia. Encephalitis and death can also occur, and the percentage of deaths is higher in developing countries.

In 2000, measles was declared eliminated in the US. "Eliminated" is defined as the interruption of continuous transmission lasting 12 months or more. The elimination was due to high two-dose vaccination coverage, improved measles control, and intensive and rapid public health

responses to imported measles cases. Even in an elimination era, however, imported cases and limited spread still occur. After measles was declared eliminated in 2000, the majority of cases in many years were imported. A few years were exceptions, including 2008, 2011, 2013, and 2014, because of large outbreaks that spread from the initial imported case. The spike in spread cases in 2014 reflects an outbreak in Ohio among the Amish, where 368 cases have been reported.

The recommendations of the Advisory Committee on Immunization Practices (ACIP) state that all healthcare personnel should have presumptive evidence of immunity to measles, which includes any of the following:

- ☐ Written documentation of vaccination with two doses of live measles or measles, mumps, and rubella (MMR) vaccine administered at least 28 days apart
- ☐ Laboratory evidence of immunity
- ☐ Laboratory confirmation of disease
- ☐ Birth before 1957

Healthcare facilities should consider vaccinating unvaccinated personnel born before 1957 who lack laboratory evidence of measles immunity or laboratory confirmation of disease with two doses of MMR vaccine at the appropriate interval. In outbreaks, two doses are recommended for all healthcare personnel who do not have other evidence of immunity, including those born before 1957. The MMR vaccine effectiveness is very high for the measles component, with approximately 93% effectiveness for one dose and 97% effectiveness for two doses.

Many factors affect the risk of measles transmission. Measles is the most contagious of the vaccine-preventable diseases. Patients are infectious four days before through four days after rash onset. The virus can remain in the air for up to two hours after the patient leaves the area. Intensity of exposure, or the dose of virus received, is an important risk factor for breakthrough infection. Many US healthcare providers have never seen a case of measles. Measles is often not considered in the differential diagnosis, so appropriate infection control measures are often not implemented. Patients may expose others in the waiting room, the laboratory, or in other common areas.

Measles is a well-described nosocomial problem. Due to the severity of measles, infected persons are likely to seek medical care in primary health care, emergency departments, or hospital settings. The risk of acquiring measles is estimated to be 2 to 19 times higher for susceptible healthcare personnel than for the general population.

A total of 70 reported measles cases have been transmitted in US healthcare facilities in the post-elimination era between 2001 and July 11, 2014. Twenty-two healthcare providers have been infected while at work. Only of those workers transmitted measles to a patient during a measles outbreak in 2008. The vaccination status of this provider was unknown. There were five additional measles cases among healthcare personnel who were infected outside of work and had the potential to pass on measles to their patients or others.

The economic burden of measles outbreak responses in US healthcare facilities is notable. The estimated costs incurred by a healthcare facility to control the spread of measles has ranged from \$19,000 when a facility in Illinois responded to one measles case-patient who presented to its emergency department, to \$800,000 when two Arizona hospitals responded to seven measles case-patients in their facilities. The costs assessed included the number of healthcare personnel furloughed, time spent reviewing employee records for evidence of measles immunity, and time spent conducting serologic tests and administering vaccine doses.

Measles in persons with two-dose MMR vaccine failure has been reported, but it is rare. Transmission to a person with two-dose vaccine failure often results in modified or inapparent measles, as described in two case studies of modified measles in physicians vaccinated with at least two doses of MMR vaccine who were exposed to primary measles cases in 2009. The case studies support research suggesting that persons with two-dose vaccine failure may transmit less and be less infectious. It has been hypothesized that the absence or reduced severity of respiratory symptoms, particularly a cough, may result in lower infectivity. Some previous reports have found no evidence that persons with modified or inapparent measles infections shed measles virus. Other literature describes situations in which measles transmission has been documented among two-dose MMR vaccine failures.

The most recently reported instance of a person with two-dose MMR vaccine failure transmitting measles to others occurred in New York City in 2011. A two-dose vaccinated theater employee with classic symptoms of measles transmitted it to four other individuals, all of whom had prior evidence of immunity against measles. In Pennsylvania in 2003, an index patient transmitted measles to five others, including to two two-dosed vaccinated persons, and one of the two-dose failures transmitted to two unvaccinated persons. In Finland in 1989, two-dose vaccinated and unvaccinated primary patients were found to be equally contagious within families: attack rates among family members were 47% and 43%, respectively. In Wisconsin in 1986, a two-dose vaccinated index patient with classic symptoms transmitted to 13 previously-vaccinated classmates. Although none of these instances of transmission occurred from an infected healthcare provider or in a healthcare setting, the examples show that the risk is present.

**David T. Kuhar, M.D.**  
**Medical Officer, Division of Healthcare Quality Promotion**

Dr. Kuhar presented recommendations regarding measles infection control. Recommendations for infection control precautions for measles were published in *Immunization of Healthcare Personnel* in 2011. The recommendations indicated airborne precautions. When a negative pressure room is not available, patients should be placed in single-patient rooms with the door closed. If possible, only staff with evidence of immunity should provide patient care. However, regardless of immunity status, all staff entering the room should wear respiratory protection at least as protective as an N95 respirator. The rationale for the recommendation for respiratory protection among personnel with evidence of immunity was due to the rare event of vaccine failure.

The 2007 Guidelines for Isolation Precautions also provide infection control recommendations for measles. In the Appendix A table summarizing recommended precautions, recommendations for measles such as favoring patient care performed by personnel with evidence of immunity are listed. However, the isolation precautions guidelines indicate “No recommendation for face protection for immune personnel or the type of face protection needed for susceptible healthcare personnel.” In the section on the use of PPE, the guidelines indicate that the use of PPE for susceptible personnel or those with evidence of immunity remains an unresolved issue. In the respiratory protection section, the guidelines indicate that no data are available upon which to base a recommendation for respiratory protection for measles. They also indicate that the question of whether respiratory protection will enhance protection from measles has not been studied. The guidelines do mention that although there is no evidence to suggest that facemasks are inadequate for protection, facilities may require the use of respirators for entry into all airborne infection isolation rooms (AIIRs) for consistency and simplicity, as well as because of potential difficulties in ascertaining immunity in personnel.

Data on current infection control practices for measles are not available, but there are anecdotal indications that healthcare personnel with or without evidence of immunity to measles are not wearing facemasks or respirators when entering the rooms of measles patients in some healthcare facilities. In some cases, the 2007 Isolation Precautions Guidelines statement of “No recommendation for face protection or type of face protection for healthcare personnel” has been interpreted as meaning that use of a facemask or respirator is not recommended for contact with known or suspected measles cases.

Because of the different approaches for measles PPE recommendations in current guidelines, CDC feels that the issue should be clarified. There is increased domestic measles activity, and those with measles are likely to seek medical care. It is a highly contagious disease with a prodromal phase in which the disease is contagious and may not be correctly identified. Though vaccination remains the primary means of measles control, there are rare reports of transmissions to healthcare personnel who have received two doses of the vaccine or had previous serologic evidence of immunity. Though data to support and guide the type of PPE needed to prevent measles transmission would be ideal, studies indicating the differential efficacy of PPE for measles are unlikely to be conducted.

CDC proposes interim guidance to update the “No recommendation for PPE” in the 2007 isolations precautions guidelines, given the confusion regarding the wording of the “no recommendation. The suggested recommendation is:

“When entering the room of a patient with suspected or confirmed measles, healthcare personnel should wear respiratory protection at least as protective as a NIOSH-certified N-95 respirator, regardless of presumptive evidence of immunity to measles.”

In light of rare difficulties in establishing evidence of immunity among healthcare personnel, it makes sense to indicate that an N-95 respirator should be used by all personnel coming into contact with patients with known or suspected measles, regardless of presumptive evidence of immunity. Exact wording and provision of the interim guidance is being discussed.

HICPAC members’ and liaisons’ experience with measles at their facilities and their feedback on a proposed change is requested. Are there reservations about such an approach?

### Discussion Points

There are unintended consequences associated with having no recommendation, as they have experienced with other guidelines.

The interim guidance should be simple. HICPAC suggested that the guidelines remove reference to any evidence of immunity. When any healthcare worker walks into an isolation room without PPE, it sends the message that PPE does not need to be worn. If a healthcare worker is entering an AIIR, regardless of cause, he or she should wear an N-95-type respirator or higher, regardless of immunity.

There are cases of people who have used N-95 respirators or had documented immunity and/or two doses of vaccine who have contracted measles.

There was discussion regarding the variability and reliability of commercial laboratory testing for measles immunity. This issue has arisen in the past during mumps outbreaks. Few hospitals conduct measles antibodies testing. Vaccines are imperfect, as experiences with pertussis and mumps have demonstrated. CDC encourages the use of the reference laboratory and CDC



laboratories. There is good correlation between enzyme immunoassay (EIA) levels and neutralizing antibody, but nothing is perfect. There are false positives and false negatives.

A large number of the measles is imported. A long measles outbreak is still ongoing in the Philippines. Lessons learned from tuberculosis (TB) may apply to measles, such as screening prior to arrival or receipt of a visa. CDC has considered a quarantine for foreigners coming into the US, but most of the measles cases are US citizens who refuse to be vaccinated and who travel abroad. Most foreigners visiting the US do not come on visas. There is a recommendation, not a requirement, for persons traveling internationally to have two doses of the measles vaccine. CDC's Travelers Health Branch has been working to spread the message about measles outbreaks in the Philippines, Vietnam, and throughout Europe.

The active refusal of MMR is a major issue in some countries in Western Europe. Another issue is access to care. In the recent outbreak in New York City, the child who was likely the index case was from the Dominican Republic and had never been vaccinated. A single response will not address all of the issues associated with measles. Given that measles has serious consequences in non-immunized people, CDC should consider other options for prevention of further importation to the US.

Whatever CDC decides about healthcare personnel should be extended to public health personnel as well.

There is no evidence or reason to suspect that the virus is more virulent or has changed. The epidemiology of measles shows that unvaccinated cases are the main issue. The vaccine effectiveness has remained consistent.

CDC's communication, education, and outreach to healthcare providers has been strong because measles is frequently not recognized. CDC has created webinars, web sites, and other materials and has worked with professional organizations.

Some departments of health encourage proactive vaccination in the setting of increased domestic transmission when documentation is not available. It is better to be proactive than to wait for exposure. The costs of measles infections are high, and most of the costs are related to not having easy documentation of evidence of immunity for healthcare workers.

Regarding re-immunization of healthcare workers, the ACIP recommendation is for two doses. The recommendation also states that follow-up serology not needed, but if one is drawn inadvertently and comes back negative or borderline, then the vaccination status should supersede the serological result.

Vaccines are frequently handled, maintained, and managed under poor conditions in healthcare facilities, where most immunizations for healthcare personnel occur. Issues such as redundant power, regular checking of temperatures, storage of the vaccine within the refrigerator, frequently do not meet current guidelines in the vaccine toolkit. The guidance could include reminders regarding how live vaccines should be handled and stored.

The statement about "presumptive evidence of immunity" is important. Its elimination could lead to confusion; without it, a person who believes he is immune could think that the guidance does not apply to him. It was suggested that word "presumptive" be removed so that the guideline refers to "regardless of evidence of immunity."

No members of HICPAC disagreed with the recommendation.

Meeting Minutes: Healthcare Infection Control Practices Advisory Committee  
July 17-18, 2014 ||

## Public Comment

Dr. Fishman called for public comment at 11:39 am. No public comments were offered.

## Wrap-Up

Dr. Fishman reviewed the HICPAC meeting. The meeting began with updates on the status of the SSI guideline and the status of the guideline for prevention of infection in the NICU. HICPAC then discussed how to address the 1999 CDC SSI prevention guidelines that were not re-reviewed in the update.

### Motion

Dr. Babcock moved that HICPAC accept the 1999 CDC SSI prevention recommendations discussed to be carried forward as presented, pending the recommended changes. Dr. Huang seconded the motion. The motion carried unanimously with no abstentions.

Dr. Fishman reminded HICPAC of the discussion regarding HICPAC recommendations for the document that is currently called “Core Infection Prevention and Control Practices,” noting that the name will be changed.

### Motion

Dr. Babcock moved for provisional acceptance of the “Core Infection Prevention and Control Practices” document, pending recommended changes, including the change of the document title. Dr. Talbot seconded the motion. The motion carried unanimously with no abstentions.

Dr. Fishman summarized HICPAC’s discussion of outbreaks related to use of duodenoscopes. HICPAC concluded that the issue needs to be studied, but it is the manufacturers’ responsibility to study the outbreak, because the studies cannot be conducted at the hospital level.

HICPAC also discussed CAUTI. HICPAC has concerns about the standardized DUR as it is currently defined. Data are gathered at the group level, not the individual level, and is therefore susceptible to outliers. Additionally, it is not risk-stratified. At this time, HICPAC does not feel that it is appropriate to use the standardized DUR as a quality metric. HICPAC appreciates the work that has gone into developing the metric and would like to see it developed further and looks forward to learning about changes made based on their input.

The CAUTI discussion also focused on the definition of CAUTI. HICPAC feels that a clinically-relevant definition of CAUTI is required that can be used as meaningful quality improvement metric. HICPAC proposes the following considerations for the definition:

- ☐ Greater than 10<sup>5</sup> uropathogens, excluding yeast
- ☐ Less than or equal to two pathogens, excluding yeast
- ☐ Including fever
- ☐ Excluding urinalysis

HICPAC requests that the new definition be used in the TAP reports. HICPAC also feels that it will be useful to have a measure of urine culture utilization as a quality improvement metric and

recommends the development of that metric. One of the goals is to aim for an entirely electronic approach. HICPAC also agreed to the inclusion of fever without attribution; no adjudication of fever source is necessary. Since the higher cutoff of  $10^5$  is used, it is reasonable to include fever without attribution because it can be easily tracked electronically. HICPAC recognizes that this definition may lead to a decrease in CAUTI; however, the definition will be more clinically relevant and also may lead to an increase in primary CLABSI.

Dr. Cardo thanked HICPAC for the feedback.

With that, Dr. Fishman adjourned the HICPAC meeting at 11:51 am.

### **Certification**

I hereby certify that, to the best of my knowledge and ability, the foregoing minutes of the July 17-18, 2014, meeting of the Healthcare Infection Control Practices Advisory Committee, CDC are accurate and complete.

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Date

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Neil Fishman, MD  
Chair, Healthcare Infection Control Practices  
Advisory Committee, CDC

## Attachment #1: Acronyms Used in this Document

Acronym	Expansion
ACIP	Advisory Committee on Immunization Practices
ACOEM	American College of Occupational and Environmental Medicine
AER	Automated Endoscope Reprocessor
AHA	American Hospital Association
AHCA	American Health Care Association
AHRQ	Agency for Healthcare Research and Quality
AIIR	Airborne Infection Isolation Room
AMD	Advanced Molecular Detection
AMR	Antimicrobial Resistance
AORN	Association of periOperative Registered Nurses
APIC	Association of Professionals of Infection Control and Epidemiology
ARLG	Antibacterial Resistance Leadership Group
ASTHO	Association of State and Territorial Health Officials
ATP	Adenosine TriPhosphate
BAL	Bronchoalveolar Lavage
BEAST	Bayesian Evolutionary Analysis Sampling Trees
BSI	Bloodstream Infection
<i>C. difficile</i>	<i>Clostridium difficile</i>
CAD	Cumulative Attributable Difference
CAP	College of American Pathologists
CAUTI	Catheter-Associated Urinary Tract Infection
CBI	Catheter-Related Bloodstream Infection
CC	Clonal Complex
CDC	Centers for Disease Control and Prevention
CDI	<i>Clostridium difficile</i> infection
CFU	Colony-Forming Unit
CLABSI	Central Line-Associated Bloodstream Infection
CMS	Centers for Medicare and Medicaid Services
CRE	Carbapenem-Resistant Enterobacteriaceae
CSTE	Council of State and Territorial Epidemiologists
CUSP	Comprehensive Unit-based Safety Program
DFO	Designated Federal Official
DHQP	Division of Healthcare Quality Promotion
DHS	(United States) Department of Homeland Security
DUR	Device Utilization Ratio
<i>E. coli</i>	<i>Escherichia coli</i>
EHR	Electronic Health Record
EIA	Enzyme Immunoassay
EIP	Emerging Infections Program
EOC	Emergency Operations Center
EPA	(United States) Environmental Protection Agency
ERCP	Endoscopic retrograde cholangiopancreatography
FDA	(United States) Food and Drug Administration
FEMA	Federal Emergency Management Agency
FGI	Facilities Guidelines Institute
GI	Gastrointestinal
GRADE	Grading of Recommendations Assessment, Development and Evaluation

Acronym	Expansion
HAI	Healthcare-Associated Infection
HEN	Hospital Engagement Network
HHS	(United States Department of) Health and Human Services
HICPAC	Healthcare Infection Control Practices Advisory Committee
HRSA	Health Resources and Services Administration
ICHE	<i>Infection Control and Hospital Epidemiology</i>
ICU	Intensive Care Unit
ID	Infectious Disease
IDSA	Infectious Diseases Society of America
IV	Intravenous
K	<i>Klebsiella</i>
KPC	<i>Klebsiella pneumoniae</i> carbapenemase
MALDI	Matrix-Assisted Laser Desorption/Ionization
MDI	Microbiome Disruption Index
MDRO	Multidrug-Resistant Organism
MERS-CoV	Middle East Respiratory Syndrome Coronavirus
MMR	Measles, Mumps, and Rubella
MMWR	Morbidity and Mortality Weekly Report
MRSA	Methicillin-resistant <i>Staphylococcus aureus</i>
NACCHO	National Association of County and City Health Officials
NCEZID	National Center for Emerging and Zoonotic Infectious Diseases
NDM	New Delhi metallo- $\beta$ -lactamase
NHGRI	National Human Genome Research Institute
NHSN	National Healthcare Safety Network
NICU	Neonatal Intensive Care Unit
NIH	National Institutes of Health
NIOSH	National Institute for Occupational Safety and Health
NQF	National Quality Forum
OPA	ortho-Phthalaldehyde
OSHA	Occupational Safety and Health Administration
PCAST	President's Council of Advisors on Science and Technology
PCORI	Patient-Centered Outcome Research Institute
PFGE	Pulsed-Field Gel Electrophoresis
PIDS	Pediatric Infectious Diseases Society
PPE	Personal Protective Equipment
PPS	Prospective Payment System
PPV	Positive Predictive Value
QI	Quality Improvement
QIO	Quality Improvement Organization
RCT	Randomized Controlled Trial
RepPCR	Repetitive Element Palindromic Polymerase Chain Reaction
SAS	Statistical Analysis System
SCCM	Society of Critical Care Medicine
SCI	Spinal Cord Injury
SHEA	Society for Healthcare Epidemiology of America
SHM	Society of Hospital Medicine
SIR	Standardized Infection Ratio
SIRS	Systemic Inflammatory Response Syndrome
SIS	Surgical Infection Society

Acronym	Expansion
SNP	Single Nucleotide Polymorphism
SSI	Surgical Site Infection
SUR	Standardized Utilization Ratio
SUTI	Symptomatic Urinary Tract Infection
TAP	Targeted Assessment for Prevention
TB	Tuberculosis
UTI	Urinary Tract Infection
VA	(United States Department of) Veterans Affairs
VRE	Vancomycin-Resistant <i>Enterococcus faecium</i>
WBC	White Blood Cell
WGS	Whole Genome Sequencing
WHO	World Health Organization

## Attachment #2: Liaison Reports

### Ex-Officio Report

#### HEALTHCARE INFECTION CONTROL PRACTICES ADVISORY COMMITTEE (HICPAC)

##### Centers for Disease Control and Prevention

Meeting Date: July 17-18, 2014

Meeting Location: Centers for Disease Control and Prevention, Atlanta, GA

Ex-officio name: David K. Henderson, M.D.

Organization represented: **National Institutes of Health**

#### Interim Activities and updates:

1. Vancomycin-resistant *Enterococcus faecium* (VRE) continues to present a major challenge for institutions treating chronically immunosuppressed patients. VRE colonization and infection at the NIH Clinical Center increased substantially in 2009 and we worked diligently to control spread – focusing our efforts initially on decreasing the VRE environmental burden. Subsequently we have conducted a detailed analysis of a cohort of 333 patients detected as colonized with VRE between 2007 and 2013.
  - VRE colonization was detected in 65% of patients by surveillance swabs; the remaining 35% were identified by clinical cultures. Of the 215 identified by surveillance swabs, 24% later grew VRE from clinical cultures. Of the 215 patients that were identified by surveillance, 65% grew VRE in culture, and 35% had positive *vanA* PCRs, but negative cultures. Of those detected by PCR alone, only 30% eventually had VRE in any culture (surveillance or clinical). PCR-positive/culture-negative specimens grew 41 organisms: vancomycin-susceptible *E. faecium/faecalis* (27%), vancomycin-resistant *E. faecalis* (5%), *E. gallinarum/casseliflavus* (44%), and others (24%). PCR had a positive predictive value of only 43%, and, curiously, 95% of identified organisms were not VRE. The low positive predictive value of PCR testing is likely influenced by vancomycin resistance genes in non-VRE bacteria.
  - Of 140 patients who had positive surveillance cultures, 33% eventually grew VRE from clinical cultures. Whereas 32% had  $\geq 3$  subsequent negative swabs, 21% of ‘apparently cleared’ patients later grew VRE a median of 46 days after the last negative surveillance culture.
2. Management of Healthcare-Associated Transmission of Multiply Resistant Gram-Negative Bacilli in the Clinical Center.
  - The CC Hospital Epidemiology Program continues to maintain vigilance about the potential for transmission of highly resistant Gram-negative bacilli. We have continued monthly whole-house surveillance, as well as twice weekly surveillance in the ICU and other high-risk units. We routinely culture every patient on admission, and routinely place patients who are transferred from other institutions on contact isolation. We have detected 15 additional patients colonized with unrelated CRE isolates that are genetically distinct from the cluster strain.
  - Of 13,762 orders for whole-house surveillance swabs, 11,754 swabs from 3,843 patients were collected, an 85% compliance rate, (with the gap largely due to patient refusal). Most swabs were cultured (95.8%), with 4.2% tested directly by PCR for *bla*KPC. Among 15 patients who had newly identified CRE isolates, 11 were KPC+ (1 acquired the outbreak strain in July, 2012), and 4 isolates had other mechanisms of carbapenem resistance. Since 7/2012, no instances of hospital transmission have been detected. Of 343 environmental samples, 12 (4.4%) grew CRE (9 sink drains, 1 faucet aerator, 1 handrail, and 1 medication room surface); all but two were epidemiologically linked to colonized patients. We continue to use whole genome sequencing to assess CRE epidemiology and to try to delineate the relative contributions of personnel and



the inanimate environment to healthcare-associated spread of these organisms.
Position statements:
Legislation:
Campaigns and related activities:
Press activities:
Publications:
<ol style="list-style-type: none"> <li>1. Kuhar DT, Struble KA , Henderson DK. Reply to Tan <i>et al.</i>, regarding Updated US. Public Health Service guidelines for the management of occupational exposures to HIV and recommendations for postexposure prophylaxis. <i>Infect Control Hosp Epidemiol</i>. 2014; 35(3): 328-9</li> <li>2. Henderson DK, Lee LM, Palmore TN. The contemporary Semmelweis Reflex: History as an imperfect educator. <i>Infect Control Today</i>. 2014; 18(6): 36-40.</li> <li>3. Safdar N, Anderson DJ, Braun BI, Carling P, Cohen S, Donskey C, Drees M, Harris A, Henderson DK, Huang S, Juthani-Mehta M, Lautenbach E, Linkin DR, Meddings J, Miller L, Milstone A, Morgan D, Sengupta S, Varman M, Yokoe D, Zerr D. The evolving landscape of healthcare-associated infections: Recent advances in prevention and a roadmap for research. <i>Infect Control Hosp Epidemiol</i> 2014; 35(5):480-93.</li> <li>4. Herrick JA, Lederman RJ, Sullivan B, Powers JH, Palmore TN. Brucella arteritis: clinical manifestations, treatment, and prognosis. <i>Lancet Infect Dis</i>. 2014;14(6):520-6.</li> <li>5. Decker BK, Palmore TN. Waterborne pathogen detection: more than just "location, location, location...". <i>Infect Control Hosp Epidemiol</i>. 2014;35(2):130-1.</li> <li>6. Kost RG, Lee LM, Yessis JM, Wesley R, Alfano S, Alexander SR, Kassis SB, Cola P, Dozier A, Ford DE, Harris P, Kim E, Lee SC, O’Riordan G, Roth M-T, Wasser J, Henderson DK, Collier BS. Research participant-centered outcomes from NIH-supported clinical research centers. <i>Clin Trans Sci</i> 2014 ePub ahead of print: 2014/05/21. <i>In press</i>.</li> </ol>
Other items of note:
Dr. Tara Palmore has assumed the role of Clinical Center Hospital Epidemiologist. Dr. David Henderson maintains his current dual appointment as Deputy Director for Clinical Care and Associate Director for Clinical Quality, Patient Safety and Hospital Epidemiology.

**Liaison Report**  
**HEALTHCARE INFECTION CONTROL PRACTICES ADVISORY COMMITTEE (HICPAC)**  
**Centers for Disease Control and Prevention**

Meeting Date: July 17 – 18, 2014

Meeting Location: Centers for Disease Control and Prevention, Atlanta, GA

Liaison name: Michael Anne Preas, RN, BSN, CIC

Organization represented: **Association for Professionals in Infection Control and Epidemiology**

Interim activities and updates:
APIC Text of Infection Control and Epidemiology released June 2014
Guidelines and Guidance: Please include both in-progress and planned in the coming year. If you have a different format (e.g., information on a website) you don't have to list them here but could just include the link to the website.
Released <ul style="list-style-type: none"> <li>• Implementation Guide for the Prevention of Catheter-Related Urinary Tract Infections</li> <li>• Manual for the Prevention of Infections in Long Term Care Facilities</li> </ul> In process <ul style="list-style-type: none"> <li>• Implementation Guide for the Prevention of Catheter-Related Bloodstream Infections</li> <li>• Implementation Guide for the Prevention of Ventilator Associated Events</li> <li>• Implementation Guide for Hand Hygiene</li> </ul>
Position statements:
Legislative and Regulatory activities:
<ul style="list-style-type: none"> <li>• Submitted comments to NQF on AHRQ draft Common Formats for Surveillance – Hospitals</li> <li>• Responded to NIOSH Request for Information on respiratory protective devices</li> <li>• Submitted comments to NQF on NQF-endorsed measures for care coordination</li> <li>• Submitted comments to NQF on NQF-endorsed Patient Safety measure</li> <li>• Submitted comments to CMS on the proposed adoption of the 2012 Life Safety Code</li> <li>• Submitted comments to FDA on the draft Guidance for Industry on vial fill size for injectable drugs</li> <li>• Submitted comments to CMS on the FY15 Inpatient Rehabilitation Facility (IRF) Prospective Payment System proposed rule</li> <li>• Submitted comments to CMS on the FY15 Inpatient Psychiatric Facility (IPF) Prospective Payment System proposed rule</li> <li>• Submitted comments to CMS on the FY 15 Hospital Inpatient Prospective Payment System (IPPS/LTCH) proposed rule</li> <li>• Joined IDSA and 24 other organizations to support funding for CDC's Detect and Protect Against Antimicrobial Resistance Initiative</li> <li>• Joined Pew Charitable Trusts and other public health organizations to submit a letter to FDA seeking ADUFA sales data and additional transparency on Guidance 213</li> <li>• Joined Pew Charitable Trusts and other public health organizations to submit a letter to the President's Council of Advisors on Science and Technology (PCAST) on the use of antimicrobials in animals</li> </ul>
Campaigns and related activities:
<ul style="list-style-type: none"> <li>• Launched advocacy effort in support of funding for NHSN, the Advanced Molecular Detection (AMD) Initiative, and the Detect and Protect Against Antimicrobial Resistance Initiative</li> </ul>

<ul style="list-style-type: none"> <li>○ Letter to Congressional appropriations committees signed by 32 organizations</li> <li>○ APIC Action Alert encouraging grassroots advocacy by members and public</li> <li>• Planning underway for International Infection Prevention Week, October 19-25. <ul style="list-style-type: none"> <li>○ 2014 focus will be on antibiotic resistance; new consumer infographic will be created.</li> </ul> </li> <li>• Discussions taking place on broadening reach of “Infection Prevention and You” campaign through partnerships with consumer organizations.</li> <li>• Worked with AHA on development of an antimicrobial stewardship toolkit APIC provided resources for inclusion in the toolkit, which was launched July 1.</li> </ul>
Press activities:
<ul style="list-style-type: none"> <li>• Issued press releases on key articles in APIC’s scientific journal <i>AJIC</i>. Topics included: <ul style="list-style-type: none"> <li>○ May: Control of a two-decade endemic situation with carbapenem-resistant <i>Acinetobacter baumannii</i>: electronic dissemination of a bundle of interventions</li> <li>○ June: Implementation and Impact of Ultraviolet Environmental Disinfection in an Acute Care Setting</li> <li>○ July: Video observation to map hand contact and bacterial transmission in the OR</li> <li>○ August: The fist bump: a more hygienic alternative to the handshake</li> </ul> </li> <li>• Promoted scientific research from APIC 2014 Annual Conference on CLABSI prevention (“Bloodstream infections reduced through better central line care at three hospitals”) and healthcare personnel flu vaccination (“Study: When hospital workers get vaccines, community flu rates fall”).</li> <li>• Issued press release on the Heroes of Infection, the Healthcare Administrator Award recipient, and Carole DeMille Achievement Award recipient.</li> </ul> <p>Media activities generated more than 66 original stories and 15 million impressions.</p>
Publications:
<ul style="list-style-type: none"> <li>• Consumer e-bulletins focused on: <ul style="list-style-type: none"> <li>○ May: Preventing urinary tract infections in healthcare facilities</li> <li>○ June: Hepatitis A and Measles</li> <li>○ July: Recreational water illnesses</li> </ul> </li> <li>• Members of APIC’s Communications Committee create and disseminate <i>AJIC</i> article reviews for membership on a monthly basis.</li> <li>• Summer issue of <i>Prevention Strategist</i> featured articles on the new HICPAC methodology and the upcoming SSI guideline, VAP prevention, West Virginia water contamination crisis and implications for infection preventionists, Lyme disease, Capitol Comments, CIC profile, column from CBIC president, APIC president, and APIC CEO, and assorted news briefs.</li> </ul> <p>Created a special newsletter of onsite activities and news at APIC’s 2014 Annual Conference.</p>
Other items of note:
<ul style="list-style-type: none"> <li>• 41<sup>st</sup> annual APIC Annual Conference occurred in Anaheim, CA, from June 7-9, with over 2500 clinical attendees</li> <li>• Planning and revision continued for September 2014 EPI 101, EPI 201, and ASC classes</li> <li>• Work continued on APIC’s Novice Roadmap, which will plot out a novice IP’s career from Day 1 to taking the CIC exam</li> <li>• APIC became a sub-contractor on an Indiana State Department of Health grant to educate long-term care personnel. We will be creating a “Certificate of Training in Infection Prevention for Long-term Care Personnel” series.</li> <li>• Webinars were delivered in April and May 2014 to a total audience of around 3000 attendees.</li> </ul>

**Liaison Report**  
**HEALTHCARE INFECTION CONTROL PRACTICES ADVISORY COMMITTEE (HICPAC)**  
**Centers for Disease Control and Prevention**

Meeting Date: July 17-18, 2014

Meeting Location: Centers for Disease Control and Prevention, Atlanta, GA

Liaison name: Mark Rupp, MD

Organization represented: **SHEA**

**Interim activities and updates:**

**ACCME Reaccreditation**

In late March, SHEA received its 4 year reaccreditation from the Accreditation Council on Continuing Medical Education (ACCME). SHEA is now accredited through March 2018.

***SHEA Spring 2014 Conference: Advancing Healthcare Epidemiology: Crisis & Controversies***  
***(April 3-6, 2014 – Denver, CO)***

In April, SHEA had its 3<sup>rd</sup> Annual Spring Conference with 435 registrants in attendance. This year, we had over 70% of registrants attending the Full Conference which is higher than year's past. This conference was Chaired by: Dr. Sarah Haessler and track chairs; Drs. Arjun Srinivasan, Alex Kallen and Michael Edmond. As in prior years, this conference offered three tracks depending on an attendee's interest and training needs. For those who are new to the field or those who desire a refresher, we offer the SHEA/CDC Basic Training Course in Healthcare Epidemiology. For the more experienced epidemiologists and infection preventionists, we offer two advanced tracks. The 'Responding to Crisis' track delves deeply into the difficult issues we face in hospital epidemiology including management of outbreaks and large scale exposures within the hospital, dealing with failures of sterilization, diversions, and environmental breaches. The second advanced track 'From MRSA to CRE: Controversies in MDRO's' explores the many facets of how we detect and manage some of our most difficult foes. In this track we will explore controversial issues such as whether regional management of CRE is our best defense, whether it is really necessary to isolate patients with MRSA, whether we should be banning white coats and going bare below the elbows in addition to infection control issues in emerging therapies such as fecal transplant for *C.difficile* patients. Exciting changes were made to this year's conference including the addition of scientific abstracts from fellows and infection preventionists on the topics of CRE and other MDRO's, as well as built-in networking time and ice breakers to encourage mentoring and professional connections. Both were very well received by attendees according to our evaluations.

**IDWeek 2014**

As in 2013, SHEA is pleased to be joining IDSA, PIDS and HIVMA in IDWeek 2014 with Drs. Mary Hayden and Charles Huskins serving as SHEA's Chair and Co-Chair, respectively. On June 5 & 6, the Committee Chairs from all organizations are meeting at IDSA headquarters to finalize abstract submissions for each respective category.

**Online ID Fellows Course**

SHEA has also presented a proposal to the Board on a possible Online ID Fellows Curricula on Healthcare Epidemiology and Infection Prevention. The goal is to develop a visually appealing, scenario-based learning and modern- online course (similar to the SHEA Fundamentals course) but also adding elements of the JHU Fellows Course and knowledge gained from the ID Fellowship Director Focus Groups. This course will be housed on the SHEA website and will be featuring 7 modules targeting various core knowledge areas. The process will be structured similar to authoring a chapter. The steering committee will act as the Editors of the module. The "authors" of each module (could be comprised of a senior and junior faculty member) will develop case based slides based on the curriculum assigned. Each module will have post-test questions and a certificate of completion. Feedback from the task force

and surveyed Fellowship directors emphasized the benefit for Directors to be able to use this as a measurement tool for their fellows. The committee was given an aggressive timeline from the Board. The goal is to present the final product to the ID Fellowship directors at IDWeek 2014 and launch shortly after. IDSA has endorsed this course.

***SHEA Spring 2015: Science Guiding Prevention***

Under the leadership of Co-Chairs, Drs. Eli Perencevich and Susan Huang, the SHEA 2015 conference planning is fully underway. The new format will combine the highly regarded SHEA Basic Training Course in Hospital Epidemiology with plenary, abstract and symposia with a focus on infection prevention topics including long-term care, implementation science, science communication, MDROs, device infections and stewardship. A strong emphasis will be placed on networking and mentoring sessions. The meeting will take place in Orlando, Florida, May 14-17th. The abstract site will be open from August 1, 2014 to January 16th, 2015 and awards will be given to the top abstracts.

Guidelines and Guidance: Please include both in-progress and planned in the coming year. If you have a different format (e.g., information on a website) you don't have to list them here but could just include the link to the website.

SHEA Guidelines Committee, led by Chair Dr. Gonzalo Bearman and Past Chair Dr. Kristina Bryant

***Guidelines:***

The Cystic Fibrosis Foundation, with representation from SHEA, will be publishing as a supplement in ICHE in August an infection prevention guideline, updating the 2003 guideline. SHEA continues to participate in guideline development with IDSA and others, covering topics including *C. difficile*, antimicrobial stewardship, infectious diarrhea, HAP/VAP, and nosocomial meningitis.

***Expert Guidance Papers:***

As a result of discussions between the Guidelines Committee, Research Committee, and Board of Trustees, the Guidelines Committee has embarked on several "expert guidance" statements designed to provide ungraded recommendations for practice questions that would otherwise go unaddressed for topics that lack the evidence to meet the GRADE system. These guidance statements are based on literature review, surveys, review of policies, and expert consensus.

Two multidisciplinary writing groups are in the process of writing guidance on the presence of animals in healthcare facilities and isolation precautions for visitors.

***Compendium of Strategies to Prevent Healthcare-Associated Infections in Acute Care Hospitals***

- SHEA and IDSA, with AHA, The Joint Commission, and APIC, and with representation from additional professional societies have published the following Compendium articles in ICHE: CAUTI, CLABSI, CDI, MRSA, and SSI. The "Prevention of HAIs through Hand Hygiene" and the "Prevention of VAP" articles will be published in August, along with a supplement binding the seven sections with the Executive Summary. The Executive Summary will be jointly published in AJIC. The articles went through rigorous review by an appointed Expert Panel, the relevant committees of each of the partnering organizations, the Boards of each partnering organization, and CDC, as well as a public comment period. The articles of the 2014 Update include implementation sections within each of the topic areas.
- SHEA is leading the writing process for a companion implementation document to HICPAC's "Guideline for Prevention of Infections among Patients in NICU." The writing group includes representatives from IDSA, PIDS, NANN, AAP, and Vermont Oxford, and is headed up by Kris Bryant (SHEA Guidelines Committee Past Chair) and Alexis Elward (HICPAC NICU Guidelines lead). The document will address the areas of *C. difficile*, CAUTI, MRSA, and respiratory infection prevention.
- The update of the Compendium will include edits to the patient guides based on the chapters, and the Compendium Partners are working with the CDC Foundation to develop materials and facilitate dissemination of the guides.

Position statements:
Policy:
<p><b><i>FDA Draft Guidance on Allowable Excess Volume and Labeled Vial Fill Size</i></b></p> <p>In a May 30 <a href="#">letter</a> to the Food and Drug Administration (FDA), SHEA joined with the Association for Professionals in Infection Control and Epidemiology and HONOReform, in commenting on the FDA's <a href="#">Draft Guidance</a> for Industry related to excess volumes and labeled fill sizes. The Guidance addresses the appropriate packaging sizes for injectable drug and biological products in order to prevent medication errors and misuse or pooling of leftover drug products. While SHEA is pleased that the FDA is strengthening its guidance in this area, the Society expressed concern around the use of single dose/single use vials that were reused for multiple patients, typically "off-label", and encouraged the FDA to exercise its influence to address this, among other, issues.</p> <p><b><i>FDA-Proposed Guidance on Fecal Microbiota for Transplantation</i></b></p> <p>Members of SHEA's Public Policy and Government Affairs Committee and Board reviewed and developed comments on the Food and Drug Administration's <a href="#">Guidance</a> for industry regarding enforcement policy for use of fecal microbiota for transplantation (FMT) to treat <i>Clostridium difficile</i> infection not responsive to standard therapies. In a March 27 <a href="#">letter</a> to the FDA, SHEA expressed concern about the inclusion of the restriction that "the FMT product is obtained from a donor known to either the patient or the treating licensed health care provider". The Society points out that this requirement may result in both increased risk of infection or failure of the therapy and will limit its availability for many patients.</p> <p><b><i>Coalition support for NHSN funding</i></b></p> <p>This spring, SHEA joined with a coalition of health care organizations urging leaders of the House and Senate Appropriations Committees to support \$32 million for the Centers for Disease Control and Prevention's National Healthcare Safety Network and the Prevention Epicenters Program in the FY 2015 Labor, HHS Appropriations bill. Other priorities highlighted in the letter include \$30 million for the CDC's Detect and Protect Against Antibiotic Resistance Initiative and an additional \$30 million for the Advanced Molecular Detection Initiative. The coalition correspondence may be viewed at this <a href="#">link</a>.</p> <p><b><i>NIOSH Request For Information on Respiratory Protective Devices</i></b></p> <p>SHEA and IDSA submitted joint comments this spring to the U.S. National Institute for Occupational Safety and Health (NIOSH) in response to its <a href="#">request for information</a> on respiratory protective devices (RPDs) used in health care. NIOSH is exploring the desirability of incorporating additional requirements and tests in its respirator approval process to parallel the protections in the FDA clearance process for Surgical N95 respirators (surgical and nonsurgical environments). The <a href="#">joint submission</a> supports streamlined approval of respirators as well as clarity, transparency, and harmonization of regulatory requirements so that, in cases of pandemics or other infectious disease outbreaks, health care institutions have in stock RPDs that meet federal standards of impermeability, variable aerosol and inflammability.</p>
Campaigns and related activities:
<p><b><i>SHEA Research Network (SRN) and Research Committee</i></b></p> <p>The Research Committee, under the leadership of Chair Nasia Safdar, MD and Past Chair Ebbing Lautenbach, MD, MPH, MS, published in May "The Evolving Landscape of Healthcare-Associated Infections, Recent Advances in Prevention and a Roadmap for Research." This white paper addresses changes and advances in healthcare epidemiology research since the original paper was published in 2010 in ICHE, and also provides an overview of priority research topics for the future.</p> <p>The SHEA Research Network (SRN) is completing the following projects::</p> <ul style="list-style-type: none"> <li>• 2013 Epi Project (PI: Clare Rock), which seeks to develop a more accurate marker of overall hospital quality that can be objectively applied and compared across hospitals.</li> </ul>

- 2013 end of year survey regarding members' experiences belonging to the SRN, and several practice questions that the SRN will track year-to-year
- The role of the patient safety climate in CAUTI prevention (PI: Daniel Livorsi)

The SRN recently launched two surveys:

- Forgoing contact precautions for endemic MRSA and VRE (PIs: Gonzalo Bearman, Dan Morgan)
- Isolation Precautions for Visitors (PI: Silvia Munoz-Price)

#### Press activities:

Below is a list of press releases that SHEA has released in the past few months. To read the complete text of any of the releases visit [www.shea-online.org/JournalNews/PressRoom/PressReleaseArchives.aspx](http://www.shea-online.org/JournalNews/PressRoom/PressReleaseArchives.aspx).

- 06/23/14 - SHEA Signs on to the World Alliance Against Antibiotic Resistance (WAAAR) declaration against antibiotic resistance
- 06/11/14 - Coordinated Infection Prevention Intervention Shown to Reduce Prevalence of Drug-Resistant CRE in Long-Term Care Facilities
- 06/11/14 - New Strategies to Combat MRSA in Hospitals
- 06/11/14 - Expert CLABSI Guidance Adds Real World Implementation Strategies
- 05/15/14 - Infectious Disease Experts Comment on MERS-CoV Response
- 05/06/14 - Expert Guidance Strengthens Strategies to Prevent Most Common and Costly Infection
- 05/06/14 - New Expert Guidelines Aim to Focus Hospitals' Infectious Diarrhea Prevention Efforts
- 04/30/14 - Society for Healthcare Epidemiology of America and Cambridge University Press Announce Publishing Partnership
- 04/10/14 - New SHEA Epi Project Winner to Examine Best Practices in HAI Surveillance
- 04/08/14 - Expert Guidance Highlights Practices to Reduce Prevalence of Catheter-Associated UTIs
- 04/08/14 - Kitchens are a Source of Multi-Drug Resistant Bacteria
- 03/26/14 - Healthcare-Associated Infections Reduced in U.S.
- 03/07/14 - Emerging Multi-Drug Resistant Infections Lack Standard Definition and Treatment
- 03/07/14 - Hospital Food Safety Measures Reduce Risk of Contaminated Hospital Food

The SHEA/Medscape collaboration continues featuring expert commentaries and select articles from *Infection Control and Hospital Epidemiology*. The SHEA page is available at:

[www.medscape.com/partners/she/public/she](http://www.medscape.com/partners/she/public/she) SHEA also helped collaborate on an in depth article about SHEA's Expert Guidance on Healthcare Worker Attire with Medscape.

SHEA has an active social media presence:

LinkedIn – The Society for Healthcare Epidemiology Group

Twitter: @SHEA\_Epi

Facebook: [www.facebook.com/SHEAPreventingHAIs](http://www.facebook.com/SHEAPreventingHAIs)

#### Publications:

#### **Compendium of Strategies to Prevent Healthcare-Associated Infections in Acute Care Hospitals – 2014 Update**

The updated Compendium continues to be released with ICHE. A dedicated supplement with all the Compendium sections will be printed in time for distribution at IDWeek 2014.

#### **New Publisher**

ICHE will be switching publishers in January 2015 to Cambridge University Press. SHEA is excited for this change and looks forward to working with Cambridge University Press in the future.

#### Other items of note:

#### **HHS/APIC/SHEA Partnership in Prevention Award**

SHEA is working with HHS and APIC to solicit applications for the 2014 Partnership in Prevention Award.

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July 17-18, 2014 ||

The award program will recognize prevention leaders in the U.S. acute care community who have achieved wide-scale reduction and progress toward elimination of targeted health care associated-infections (HAIs). It also intends to showcase the outstanding efforts of clinicians, hospital executives, and hospital facilities that have improved clinical practice through utilization of evidence-based guidelines, achieved and maintained superior prevention results, and advanced best practices to improve patient safety. For more information on how to apply, please download the application criteria at <http://www.shea-online.org/About/SHEAAwards.aspx>.



**Liaison Report**  
**HEALTHCARE INFECTION CONTROL PRACTICES ADVISORY COMMITTEE (HICPAC)**  
**Centers for Disease Control and Prevention**

Meeting Date: July 17, 2014

Meeting Location: Centers for Disease Control and Prevention, Atlanta, GA

Liaison name: Dr. Sanjay Saint

Organization represented: **Society of Hospital Medicine**

Interim activities and updates:
<ul style="list-style-type: none"> <li>• SHM is partnering with HRET on an 18 month CAUTI prevention initiative in nationally to educate hospital teams regarding best practices utilizing the Comprehensive Unit-based Safety Program (CUSP) model and catheterout.org toolkit <ul style="list-style-type: none"> <li>○ Facilitated multiple coaching calls with state hospital associations on CAUTI; presently supporting Cohorts 6, 7 and 8</li> <li>○ Attended in-person learning sessions at state hospital associations providing hospital teams with strategies for reducing CAUTI and sustaining improvements</li> <li>○ SHM is supporting a CAUTI fellowship (Project Protect: Infection Prevention Fellowship) which provides enriched training, leadership development and expert mentorship to foster the growth of dedicated leaders and infection prevention champions committed to improving safety and reducing CAUTIs</li> <li>○ Executed the second Interdisciplinary Academy for Coaching and Teamwork (I-ACT) workshop <ul style="list-style-type: none"> <li>▪ The training is an advanced level course with a focus upon three main components: complex clinical CAUTI challenges, socio-adaptive issues among a multidisciplinary team and effective coaching</li> <li>▪ Attendees included Project Protect fellows, faculty experts and state leads; formally launched the Project Protect Fellowship</li> </ul> </li> </ul> </li> <li>• Received notification of award for additional subcontract to work in partnership with HRET to reduce CAUTI in the long term care setting <ul style="list-style-type: none"> <li>○ Presently serving on Content Development and Recruitment Subcommittees</li> <li>○ Identified five faculty experts who will provide coaching support for organizational leads, physicians and staff at long term care facilities</li> <li>○ Assisted with content development for specific learning sessions</li> <li>○ Will support onboarding activities for Cohort 2; there are 8 lead organizations presently confirmed</li> </ul> </li> </ul>
Guidelines and Guidance: Please include both in-progress and planned in the coming year. If you have a different format (e.g., information on a website) you don't have to list them here but could just include the link to the website.
<ul style="list-style-type: none"> <li>• SHM endorsed the update to the <a href="#">2008 Compendium of Strategies to Prevent Healthcare-Associated Infections in Acute Care Hospitals</a> as per the invitation provided from the Society for Healthcare Epidemiology of America (SHEA) and the Infectious Diseases Society of America (IDSA), in partnership with the American Hospital Association (AHA), the Association for Professionals in Infection Control and Epidemiology (APIC), and the Joint Commission</li> <li>• SHM provided peer review of the 2014 ACC/AHA Guideline on Perioperative Cardiovascular Evaluation and Management of Patients Undergoing Noncardiac Surgery</li> </ul>
Position statements:
<ul style="list-style-type: none"> <li>• Signed a Friends of AHRQ letter in support of funding for FY 2015 on April 18</li> </ul>

<ul style="list-style-type: none"> <li>• Provided feedback on the 2014 IPPS and PFS rules on measures in quality reporting and pay-for-performance programs</li> <li>• Signed on to letter supporting funding of AHRQ, CDC and other organizations that could be detrimentally impacted by budget sequestration</li> </ul>
Legislation:
<ul style="list-style-type: none"> <li>• Continue to monitor, comment upon or provide endorsement for a variety of rules related to Affordable Care Act</li> <li>• Supported legislation addressing the antibiotics production pipeline</li> </ul>
Campaigns and related activities:
<ul style="list-style-type: none"> <li>• Participating in ABIM Foundation's Choosing Wisely campaign and submitted list of 5 over utilized or unnecessary tests or treatments in early September 2012 (both adult and pediatric lists) <ul style="list-style-type: none"> <li>○ One recommendation related to reducing utilization of urinary catheters</li> <li>○ Managing grant to disseminate recommendations more broadly. Through the grant, SHM launched a case study competition in June 2014 to solicit submissions of innovative projects developed based upon the Choosing Wisely campaign.</li> </ul> </li> </ul>
Press activities:
Publications:
<ul style="list-style-type: none"> <li>• <a href="#">Impact of extended-spectrum <math>\beta</math>-lactamase-producing organisms on clinical and economic outcomes in patients with urinary tract infection</a></li> <li>• <a href="#">Urinary Catheter Use and Appropriateness in U.S. Emergency Departments, 1995–2010</a></li> <li>• <a href="#">Vital Signs: Improving Antibiotic Use Among Hospitalized Patients</a></li> <li>• <a href="#">A Randomized Trial of Protocol-Based Care for Early Septic Shock</a></li> <li>• <a href="#">No Mortality Benefit with Albumin Administration in Severe Sepsis (ALBIOS)</a></li> </ul>

**Liaison Report**  
**HEALTHCARE INFECTION CONTROL PRACTICES ADVISORY COMMITTEE (HICPAC)**  
**Centers for Disease Control and Prevention**

Meeting Date: July 17-18, 2014

Meeting Location: Centers for Disease Control and Prevention, Atlanta, GA

Liaison name: Robert G. Sawyer, MD

Organization represented: **Surgical Infection Society (SIS)** Website: [www.sisna.org](http://www.sisna.org)

Interim activities and updates:
<p>The annual Surgical Infection Society meeting was held May 1-3 at the Four Seasons Hotel in Baltimore. The meeting started with a half-day review course, and was followed by two more days of that included 46 oral papers, 52 posters, and three update symposia. The annual invited William A. Altemeier Memorial Lecture was entitled "Warping disease space to improve recovery from infections," and was given by David S Schneider, PhD, Associate Professor, Microbiology and Immunology, Stanford University School of Medicine. Perhaps the most popular set of lectures concerned the microbiome and its analysis from a single patient to global perspective. The SIS also participated in the first open meeting of the International Surgical Infections Study Group (ISIS) in Vienna, Austria, 3 and 4 June 2014, entitled "Global Perspectives on Preventing Surgical Site Infections." The meeting was hosted by the SIS-Europe. Speakers from the SIS included Joseph Solomkin, E. Patchen Dellinger, and Robert Sawyer.</p>
<p>Guidelines and Guidance: Please include both in-progress and planned in the coming year. If you have a different format (e.g., information on a website) you don't have to list them here but could just include the link to the website.</p>
<p><b>1. Guidelines in process</b></p> <p>The members of the Guidelines and Therapeutics Committee are conducting the following systematic review: <b>Project: To summarize the level of evidence and determine grades of recommendations for the prophylaxis and treatment of infections in the context of traumatic injury.</b></p> <p><b>A recent conference call yielded consensus that the following sub-projects will be pursued:</b></p> <ol style="list-style-type: none"> <li>1. Sub-project 1: Facial trauma <ol style="list-style-type: none"> <li>a. 31 December 2013: completion of literature review</li> <li>b. 31 January 2014: completion of analysis</li> <li>c. 31 March 2014: manuscript submission to <i>Surgical Infections</i></li> </ol> </li> <li>2. Sub-project 2: Orthopaedic trauma <ol style="list-style-type: none"> <li>a. Pending sub-project 1</li> </ol> </li> <li>3. Project 3: TBD <ol style="list-style-type: none"> <li>a. Pending sub-project 2</li> </ol> </li> <li>4. Revision of 2010 Guidelines for the management of intra-abdominal infections <ol style="list-style-type: none"> <li>a. August 2014 Review literature</li> <li>b. October 2014 Complete analysis</li> <li>c. December 2014 Submit manuscript</li> </ol> </li> </ol>
Position statements:
Legislation:
Campaigns and related activities:
Press activities:

Recent Publications:
<p>Meta-Analysis of Prevention of Surgical Site Infections following Incision Closure with Triclosan-Coated Sutures: Robustness to New Evidence</p> <p>Frederic C. Daoud, Charles E. Edmiston Jr, David Leaper</p> <p>Surgical Infections. June 2014, 15(3): 165-181.</p>
Other items of note:

**Liaison Report**  
**HEALTHCARE INFECTION CONTROL PRACTICES ADVISORY COMMITTEE (HICPAC)**  
**Centers for Disease Control and Prevention**

Meeting Date: July 17-18, 2014

Meeting Location: Centers for Disease Control and Prevention, Atlanta, GA

Liaison name:

Organization represented: **SCCM**

Interim activities and updates:
<ul style="list-style-type: none"> <li>The Society of Critical Care Medicine's Surviving Sepsis Campaign will be providing information to a CDC panel in September on the history and current state of sepsis care in the United States. Dr. Mitchell Levy will participate as a speaker and to provide information to the convened group. The Campaign is referenced on the CDC website.</li> <li>The SCCM used all communication channels to share an emergency preparedness and response alert to a confirmed MERS-CoV case in Indiana. SCCM continues to support the CDC in spreading information to clinicians in the field as it becomes available.  <a href="http://emergency.cdc.gov/han/han00361.asp">http://emergency.cdc.gov/han/han00361.asp</a></li> <li>On April 25<sup>th</sup> SCCM offered a webcast, Consent for Research in the ICU, from the Controversies in Critical Care series, Dan Thompson, MD, MA, FCCM, and Alex Kon, MD, FCCM, discussed the challenges associated with obtaining pediatric and adult consent for complex research in critically ill patients. During the discussion, federal regulations, the SUPPORT study, and the potential impact of consent decisions on the well-being of patients and healthcare personnel were reviewed</li> </ul>
Guidelines and Guidance: Please include both in-progress and planned in the coming year. If you have a different format (e.g., information on a website) you don't have to list them here but could just include the link to the website.
Work continues on the revision of the update to 2001 consensus sepsis definitions paper. A meeting is planned in Barcelona Spain at the European Society of Intensive Care Medicine to continue the international panel's deliberations. Publication date has not yet been set.
Position statements:
<p><b>Sign-on Letter: Detect and Protect Against Antibiotic Resistance Initiative</b></p> <p>The Society of Critical Care Medicine (SCCM) recently signed onto a <a href="#">letter</a> regarding the U.S. Centers for Disease Control and Prevention (CDC) Detect and Protect Against Antibiotic Resistance Initiative. The letter urges the U.S. Congress to appropriate \$30 million included in the Fiscal Year 2015 President's Budget Request for the Detect and Protect Against Antibiotic Resistance Initiative. The initiative is part of a CDC strategy to achieve measurable results in combating the public health crisis of rapidly rising antibiotic resistance. The time to act is now, the letter states, while there is still an opportunity to prevent a post-antibiotic era in which we are unable to successfully treat infections or carry out many other healthcare activities (e.g., transplants and other surgeries, chemotherapy, care of preterm infants) currently made safe and possible by effective antibiotics.</p>
Legislation:
Campaigns and related activities:
SCCM, in collaboration with the Society of Hospital Medicine, has launched a 60-hospital quality improvement collaborative focused on the early recognition and treatment of severe sepsis on hospital

medical, surgical and telemetry units. The 18-month initiative is supported by the Gordon and Betty Moore Foundation, with additional support from the Adventist Health System for a group of 10 of its hospitals. There are a total of four regional collaboratives: West Coast, Midwest, East Coast and the Adventist Health System. The collaboratives will conclude in June 2015, followed by the development of a document that shares the experiences of the participating hospitals, in order to spread the lessons and tools with hospitals worldwide.

Press activities:

Publications:

Other items of note:

The SCCM and ESICM will be releasing an interactive app to assist clinicians in the recognition of sepsis. Links to resource materials from the SSC will be included. The app is projected to be released in September at the ESICM Congress in Barcelona and revealed during the SCCM annual meeting in January in Phoenix.

**Liaison Report**  
**HEALTHCARE INFECTION CONTROL PRACTICES ADVISORY COMMITTEE (HICPAC)**  
**Centers for Disease Control and Prevention**

Meeting Date: July 17-18, 2014

Meeting Location: Centers for Disease Control and Prevention, Atlanta, GA

Liaison name: Janet Nau Franck Global Director, Managing Infection Risk (MIR)

Organization represented: **DNV Healthcare Accreditation**

**Interim activities and updates:**

**DNV Healthcare Inc.** is a provider of hospital accreditation, infection risk management and other select standards. The company was approved in 2008 by the US Centers for Medicare and Medicaid Services (CMS) to accredit acute care hospitals in the United States and since then has also been granted CMS deeming authority for critical access hospitals. DNV Healthcare has also developed quality-based certifications for specialty areas including Comprehensive and Primary Stroke Centers. DNV Healthcare is part of the DNV GL Group which is a leading provider of classification, certification, verification and training services. With origins stretching back to 1864 and operations in more than 100 countries, our 16,000 professionals dedicated to helping our customers make the world safer, smarter and greener. DNV has launched a new survey designation that enables hospitals to reduce their risk of infection through an innovative assessment of infection risk. It is called [Managing Infection Risk \(MIR\)](#). Upon completion, the facility will become a DNV Center of Excellence to reflect the achievement. **The Managing Infection Risk (MIR) Standard provides a framework that healthcare organizations can use to build successful systems for risk reducing outcomes. This would include the identification, intervention, and evaluation of trends over time. It is a risk-based, management systems approach, designed to minimize HAIs and associated costs.**

**Guidelines and Guidance:**

The Managing Infection Risk (MIR) Accreditation standard can be downloaded at no cost at [www.DNV.com](http://www.DNV.com). Training courses and workshops are also listed and are continually updated.

**Position statements:**

**DNV has developed the Managing Infection Risk standard along with the survey designation which results in certification designation as a Center of Excellence.**

**Legislation:**

**Campaigns and related activities:**

Recent MIR initiatives have included launching initiatives in: US, Singapore, England, Spain, China, Poland, Brazil, Netherlands, Slovenia and Scotland (ISQUA) in 2013-14.

**Press activities:**

Article published in October, 2013 APIC's *Prevention Strategist* regarding the launching, program description, and benefit of MIR Certification and joining the Center of Excellence. It also describes the integral role of proactive risk assessment in mitigating risk and reducing the potential of HAIs.

**Publications:**

DNV Standard - DNV-DS-HC101- Standard for Managing Infection Risks (Apr 2012, Rev 1)

**Other items of note:**

Over 200 hundred hospitals have attended educational sessions and have expressed interest in pursuing this achievement for their facility. An International Learning Exchange will be formed for hospitals having enrolled in this status to idea share and network internationally. A Users Group for Infection Preventionists in all DNV hospitals is being created to form a clinical forum to discuss HICPAC Guidelines and evidence-based practices.

**Liaison Report**  
**HEALTHCARE INFECTION CONTROL PRACTICES ADVISORY COMMITTEE (HICPAC)**  
**Centers for Disease Control and Prevention**

Meeting Date: July 17-18, 2014

Meeting Location: Centers for Disease Control and Prevention, Atlanta, GA

Liaison name: Emily Lutterloh, MD, MPH

Organization represented: **Association of State and Territorial Health Officials (ASTHO)**

**Interim activities and updates:**

ASTHO is working in collaboration with CDC to develop tools and collect best practices for state HAI prevention. Four states (GA, IL, VT, and VA) conducted capacity building projects to assess policy barriers/opportunities in two areas: antimicrobial stewardship and accessing EHRs remotely for HAI-outbreak response. ASTHO is collecting additional tools and developing a report of lessons learned that will be disseminated in summer 2014. In addition, findings from the EHR project are feeding into a broader CDC/ASTHO multi-state assessment.

**Trainings and Presentations:**

- ASTHO and the Virginia Department of Health convened a roundtable session at the CSTE Annual Conference in June: *Innovating Public Health Response to Healthcare-Associated Infection Outbreaks by Understanding Barriers and Benefits to Electronic Health Record Access.*
- ASTHO and CDC convened a roundtable session at the CSTE Annual Conference in June: *Combating Antibiotic Resistance: Policies to Promote Antimicrobial Stewardship Programs.*

**Ongoing:**

ASTHO monitors developments in HAI-related policies and initiatives, shares this information with members, represents the state health agency perspective, and enhances collaboration with partners. ASTHO participates on the Safe Injection Practices Coalition, CSTE HAI Subcommittee and HAI Standards Committee, and National Healthcare Safety Network Steering Committee Workgroup.

**Guidelines and Guidance:** Please include both in-progress and planned in the coming year. If you have a different format (e.g., information on a website) you don't have to list them here but could just include the link to the website.

**Position statements:**

**Legislation:**

Ongoing: Real-time state HAI legislative tracking on ASTHO's website, available at [www.astho.org/state-legislative-tracking/](http://www.astho.org/state-legislative-tracking/)

ASTHO also posted a summary of bills from the 2013 session, available at <http://www.astho.org/Infectious-Disease/Healthcare-Associated-Infections/HAI-Legislative-Session-Summary-2013/>

**Campaigns and related activities:**

Ongoing: ASTHO provides information to health officials on pertinent HAI issues through conference calls (All S/THO Call) and the *State Public Health Weekly* newsletter.

**Press activities:**

**Publications:**

ASTHO's HAI Publications are available at [www.astho.org/Programs/Infectious-Disease/Healthcare-Associated-Infections/](http://www.astho.org/Programs/Infectious-Disease/Healthcare-Associated-Infections/)

**Other items of note:**





**Liaison Report**  
**HEALTHCARE INFECTION CONTROL PRACTICES ADVISORY COMMITTEE (HICPAC)**  
**Centers for Disease Control and Prevention**

Meeting Date: July 17-18, 2014

Meeting Location: Centers for Disease Control and Prevention, Atlanta, GA

Liaison name: Diana Gaviria, Berkeley County Health Department, WV

Organization represented: **National Association of County and City Health Officials (NACCHO)**

Interim activities and updates:
<ul style="list-style-type: none"> <li>(Apr-Jun) Continued supporting year three of NACCHO's local health department healthcare-associated infection (HAI) prevention demonstration project and continued supporting the following local health departments in working with state health departments to: 1) sustain and expand partnerships with local healthcare stakeholders; 2) assess HAI prevention needs within the community; and 3) promote HAI prevention and control messages <ul style="list-style-type: none"> <li>City of Milwaukee Health Department</li> <li>DuPage County (IL) Health Department</li> <li>Livingston County (MI) Department of Public Health</li> <li>Philadelphia Department of Public Health</li> </ul> <p>The DuPage County and City of Milwaukee Health Departments both hosted infection control meetings for hospitals, long-term care facilities, and other local healthcare partners to share information about HAIs, multidrug-resistant organisms, and infection control and prevention strategies. Cumulatively, over 100 participants attended these meetings.</p> </li> <li>(Ongoing unless otherwise noted) Participated in the following meetings, conference calls, and committees related to (1) obtain updates on HAIs, injection safety, antimicrobial resistance, and infection control; and (2) determine how NACCHO can support national efforts to address related issues: <ul style="list-style-type: none"> <li>Safe Injection Practices Coalition partner calls</li> <li>Council of State and Territorial Epidemiologists (CSTE) HAI standards committee calls</li> </ul> </li> <li>(July) Hosted, in collaboration with CDC's Division of Healthcare Quality Promotion, an HAI outbreak tabletop exercise for 14 attendees during a pre-conference workshop at the July 2014 NACCHO Annual conference</li> <li>(Ongoing) Shared HAI prevention and infection control news and resources via NACCHO's regular communication channels</li> </ul>
Guidelines and Guidance: Please include both in-progress and planned in the coming year. If you have a different format (e.g., information on a website) you don't have to list them here but could just include the link to the website.
<ul style="list-style-type: none"> <li>(Ongoing) Developing (based on experiences and input from the local health departments participating in NACCHO's HAI prevention demonstration project, corresponding state health departments, and a DHQP representative) an HAI guidance document development for local health departments to engage in HAI prevention activities</li> </ul>
Position statements:
<ul style="list-style-type: none"> <li>(Apr) Supported the CSTE HAI standards committee in reviewing a new draft position statement on recommendations for the role of state and local health departments in antimicrobial stewardship in the United States</li> <li>(Ongoing) Updating NACCHO's policy statement on local health department access to HAI data from the NHSN (current version available here: <a href="http://naccho.org/advocacy/positions/upload/10-03-NHSN.pdf">http://naccho.org/advocacy/positions/upload/10-03-NHSN.pdf</a>)</li> </ul>

Legislation:
N/A
Campaigns and related activities:
N/A
Press activities:
N/A
Publications:
N/A
Other items of note:
N/A

**Liaison Report**  
**HEALTHCARE INFECTION CONTROL PRACTICES ADVISORY COMMITTEE (HICPAC)**  
**Centers for Disease Control and Prevention**

Meeting Date: July 17-18, 2014

Meeting Location: Centers for Disease Control and Prevention, Atlanta, GA

Liaison name: Amber Wood

Organization represented: **AORN**

Interim activities and updates:
<ul style="list-style-type: none"><li>• New eBook for Perioperative Standards and Recommended Practices! <a href="http://www.aorn.org/RecommendedPracticeseBook/">http://www.aorn.org/RecommendedPracticeseBook/</a></li><li>• Nurse Executive Leadership Series, Multiple locations and Dates</li><li>• AORN Ambulatory Administrator Boot Camp, June 18-20, Denver, CO</li><li>• New Ambulatory Surgery Center microsite: <a href="http://www.aorn.org/ASC/">http://www.aorn.org/ASC/</a></li></ul>
Guidelines and Guidance: Please include both in-progress and planned in the coming year. If you have a different format (e.g., information on a website) you don't have to list them here but could just include the link to the website.
<p>The 2014 Perioperative Standards and Recommended Practices (RPs) include 4 new evidence rated guidelines: Pneumatic Tourniquet, Environmental Cleaning, Sharps Safety, &amp; Selection and Use of Packaging Systems for Sterilization. Ambulatory supplements provided in this edition. These guidelines are available in print and through electronic access (e-subscription and ebook). Information on how to obtain can be found at <a href="http://www.aorn.org">www.aorn.org</a>.</p> <ul style="list-style-type: none"><li>• <b>Surgical Attire is up for public comment until July 20th.</b></li><li>• Available electronically now (will be in 2015 book): Safe Environment of Care, Part 2 and Specimen Management.</li><li>• Available electronically soon: Preoperative Patient Skin Antisepsis, July 2014.</li><li>• Coming up for public comment soon: Care and Cleaning of Surgical Instruments and Powered Equipment, and Surgical Tissue Management.</li><li>• RPs in development: Thermoregulation, Local Anesthesia, Moderate Sedation, Radiation Safety, Retained Surgical Items, and Flexible Endoscopes.</li></ul>
Position statements:
Revised position statements- Noise in the Perioperative Practice Setting, Environmental Responsibility, The Role of the Health Care Industry Representative in the Perioperative Invasive Procedure Setting, and Advanced Practice Registered Nurses in the Perioperative Environment.
Legislation:
The AORN legislative priorities for 2014 are RN as circulator, preserving and protecting the Perioperative Registered Nurse's scope of practice, supporting workplace safety and patient safety initiatives, and advancing positive health care improvements.
Campaigns and related activities:
AORN is renewing the Sharps Safety Campaign.
Press activities:
TeamSTEPPS Master Trainer Course, September 4-5, Denver, CO AORN Emerging Leaders Financial Management Course, September 13, Philadelphia, PA AORN Surgical Services Management Certificate Course, October 17-18, Denver, CO AORN Ambulatory Administrator Boot Camp, November 5-7, Denver, CO Recent AORN press releases can be accessed at <a href="http://www.aorn.org">www.aorn.org</a> .
Publications:
2014 Perioperative Standards and Recommended Practices, AORN Journal, Perioperative Job Descriptions and Competency Evaluation, & Perioperative Policies and Procedures

Meeting Minutes: Healthcare Infection Control Practices Advisory Committee  
July 17-18, 2014 ||

